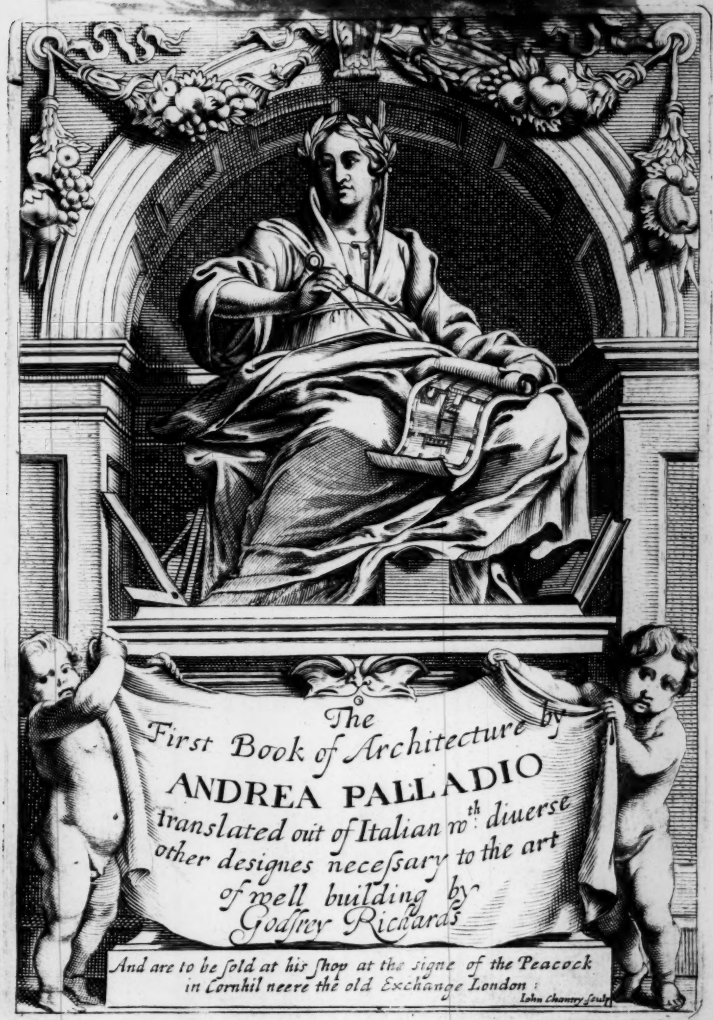
The
First Book of Architecture by
ANDREA PALLADIO
translated out of Italian wᵗʰ diuerse
other designes neceſsary to the art
of well building by
Godfrey Richards
And are to be ſold at his ſhop at the ſigne of the Peacock
in Cornhil neere the old Exchange London :
John Chantry ſculp.

THE FIRST

BOOK

OF

Architecture,

BY

ANDREA PALLADIO.

Translated out of *ITALIAN*:

With an Appendix Touching

DOORS and WINDOWS,

By Pr LE MUET Translated out of *French.*

By *G. R.*

To which are added Designes of *Floors* lately made at *Somerset-House*; And the Framing of Houses after the best manner of English Building, with their Proportions and Scantlings.

LONDON,
Printed by *J. M.* and sold by *G. Richards*, at the *Peacock* in *Cornhill* near the Old Exchange: And by *Simon Miller*, at the *Star* in St *Pauls* Church-yard, 1663.

UMI

IMPRIMATUR,

G. Brabourne, *S.S.T.P. Reverendissimo in Christo Patri, & D.D. Archiep. Cant. Sacellan. domestic.*

Jan. 27. 1662.

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G. Brabourne, *S.S.T.P. Reverendissimo in Christo Patri, & D.D. Archiep. Cant. Sacellan. domestic.*

Jan. 27. 1662.

To my Worthy and much Honoured Friend, *Daniel Colwal*, Esq;

Sir,

BEing very sensible of the many Favours which you have a long time been pleased to afford me, I dare no longer delay to acknowledge my Obligation: Although with the Addition of your farther trouble, in desiring your Perusal and Allowance of this Translation, wherein if you shall think that I have done the Author no lesse right then he hath done the Subject, I shall not doubt of the approbation of all other Ingenious persons; and that our Artists having such Examples will make it as much esteemed here as abroad; and it is only for their service that I have undertaken this work; Being sensible that I ought to present you something suitable to those higher Studies wherein you have with so much successe exercised your self, and not by any thing inferi-

our divert you from the Philoſophical and Sublime Entertainments, which you find in that Royall Society at *Greſham-Colledge*, whereof you are a Worthy Member. But this being intended for an aſſiſtance to our Ingenious Workmen, and Improvement of Engliſh *Architecture*; I ſhall therefore hope for your Patronage, and that you will own me in this, as in all other occaſions, to be,

Sir,

Your moſt Humble and Obliged Servant,

Godfrey Richards.

THE

THE PREFACE TO THE READER.

THE *Subject of this Tranſlation, being* Architecture, *doth, in the opinion of* Sr Hen: Wotton, *need no Commendation, where there are Noble Men or Noble Minds; Therefore I ſhall only give you an accompt of the Authors, and my own concernment herein; He was* Andrea Palladio, *a famous Architect of* Italy, *where taking notice of the Irregularities and Deformities in Building, introduced by invaſions of the* Gothes, *and other* Barbarians, *to prevent thoſe inconveniences for the future, he thought fit to inſtruct the world in the Rules and Practices of the Learned Ancients; having opportunity to obſerve the foot-ſteps of their labours even at* Rome *it ſelf, where being the*

the greateſt Concourſe of Noble Men and Noble Minds, they ſpared neither Care nor Coſt in Building; And in Imitation of them, our Authour is exact in his directions touching every material, as in the choice of Stone, Timber, Metals, Sand, Lime, Brick, *&c. what good, and what not, how to be prepared and put in uſe; 'tis obſerved how careful they were in the making their* Brick *and* Lime, *not forbearing the hardeſt* Stone; *for as* Sr Henry Wotton *obſerveth, that the* Italians *to this day, and much more the Ancients, did burn their firmeſt* Stone, *and even* Marble *it ſelf, where it was plentiful, which in time became* Marble *again, or at leaſt of Indiſſoluble Durity, as appeareth in the ſtanding Theatres. And other Learned Men have required that all the Timber be cut out of the ſame Foreſt, all the* Stone *out of the ſame Quarry, and the* Lime *to be made of the ſame* Stone *of which the Building is intended, imagining that they will Sympathize and joyn better by a kind of Original Kindred. But inſtead of this Curioſity, we too often make* Lime *without any great choice, and of Refuſe-Stuff, which is an Engliſh Errour, of no ſmall moment in our Buildings. After theſe Particulars, our Authour proceeds to treat of*

the

the Five Orders of Columnes, *whose Members and Proportions, as he hath laid them down, are by the Judicious esteemed the most excellent in their kind; and for some of their termes which I have changed, it was not without the Advice of Skilful Artists, thereby to conform to those termes most familiar to our Work-men. To these are added Designes of* Doores *and* Windowes, *by* P^r^ Le Muet, *Architect to the* French *King, which I thought good to present,* (Palladio *only discoursing of them*) *they being well approved by all Artists, both for their manner and Proportions*: *And the same which are in the* Louvre *at* Paris; *and out of him I have given the Proportion of* Halls *and* Chambers, *though a little differing from* Palladio, *because most agreeing to the present practice both in* England *and* France; *And for the same Reason, I do, instead of* Monsieur Muets *Designes of Frames of* Houses, *put in, such as are used here in* England, *by the direction of some of our ablest* Architects, *which (I hope) will be grateful, and very useful, not only to our Artists, but Gentlemen and others which may have occasion to Build; giving an account of all the Names proper to each Member and principal of the* House; *and also shew the*

manner

manner of framing, with their ſeveral Scantlings *and* Buttments.

The ſcarcity of Books of Architecture *in* Engliſh, *and the zeal which I find our Ingenious Artiſts have to entertaine any thing of that Subject, incouraged me to this* Eſſay; *wherein, I hope, I have rendred the Authors ſence, without diſadvantage; and for the Deſignes, they will ſpeak for themſelves.*

G. R.

THE

THE FIRST BOOK OF ARCHITECTURE;

By ANDREA PALLADIO.

CHAP. I.

What ought to be conſidered and prepared, before you begin to Build.

BEfore you begin to Build, you ought carefully to conſider every part of the Foundation and Ground-work of the Building which is to be raiſed. Three things in a Building (as ſaith *Vitruvius*) ought to be conſidered, without which it will not deſerve Commendation; Thoſe are uſefulneſs or accommodation, laſtingneſs and handſomneſs: For that work cannot be accounted perfect, which is uſeful but only for a ſhort time, or not convenient for a longer; or having theſe two, hath not alſo decency; It will be commodious, when every Part hath its due place and fit ſcituation, not below its dignity, nor above what its uſe requires; And they will be fitly diſpoſed, when the Galleries, Halls, Chambers, Cellars, and Granaries are in their proper places. As for the laſtingneſſe, you regard, that when all the walls are right by the line, thicker below then above, and have good and ſufficient foundations;

and beſides, the pillars above muſt be directly over the pillars below. And all the appertures (as Doores and Windowes) muſt be one above the other, ſo that the ſolid be upon the ſolid, and the vacant be upon the vacant. The handſomneſs will ariſe from the faire form, and the correſpondence between the whole and its parts, of the parts among themſelves, and of them to the whole: Becauſe that a Building ought to appear an intire and perfect body, wherein each member agrees with the others, and all the members be neceſſary to what you undertake.

Theſe things conſidered, in the deſign and model, you ought then diligently to calculate all the charge that may ariſe and make timely proviſion of money, and prepare what materials ſhall ſeem requiſite: So that in Building nothing may be deficient, and hinder the Complement of the work, it being no little praiſe to the builder, nor ſmall advantage to the work, that it be finiſhed with due expedition. And that all the walls be at once laid out, and equally diſpatched, from whence there will be none of thoſe clefts which uſually are ſeen in Fabricks finiſhed unequally, and at divers times.

And therefore having choſen the moſt skilful Artiſts that you can get, that ſo the work may be the better carried on by their advice; You are to provide Timber, Stones, Sand, Lime, and Metal; concerning which Proviſion, you ſhall have ſome Advertiſements; as to frame the Raftrings of the Hall and Chambers, provide your ſelf with ſo many Rafters, as when framed, there may remaine between them the ſpace of a Rafter and half.

In like manner, concerning Stone, you are to take notice, that to make the Jaumes of Doores and Windowes, you are not to have ſtone bigger then a fifth, nor leſſe then a ſixth part of the light; And if you intend to adorn the Building with Pillars or Pillaſters, make the Baſes, Capitels, and Architraves of ſtone, and the other parts of brick.

Beſides, as for the Walls, you are to conſider, that they ought to diminiſh according as they riſe; which inſtruction will ſtate the account right, and leſſen great part of the charge; And becauſe all theſe parts may be diſcourſed of in their particular places, it ſhall ſuffice to have here given this general advice, which is as a roughdraught of the whole Buiding.

But

But beſides the quantity, you are alſo to conſider the quality and goodneſſe of the materials, to chuſe the beſt; Experience gained from the buildings of others will be a great help, becauſe thereby we may eaſily know how to determine what is fit and expedient to our own purpoſe. And although *Vitruvius*, *Leon Battiſta*, *Alberti*, and other excellent Writers, have taught what is requiſite in the choice of materials, yet that nothing may be wanting in theſe Books of mine, I ſhall ſpeak of ſome, confining my ſelf to the moſt neceſſary.

CHAP. II.

Of Timber.

TImber (as *Vitruvius* hath it, *cap.* 9. *book* 2.) ought to be feſled in *Autumn*, and through all the *Winter*: becauſe then the Trees recover from the root that ſtrength and ſoundneſſe which in the *Spring* and *Summer* was diſperſed into leaves and fruit; And you are to cut them in the wane of the Moon, becauſe the moiſture which is moſt apt to rot wood, is then conſumed: from whence there will not come the worm to hurt it. It ſhould be cut but to the middle of the pith, and ſo left until it be dry, becauſe by drops there will paſſe away that moiſture which would cauſe putrefaction; Being cut, let it be laid in a place free from the extremities of Sun, Wind and Rain; and thoſe ought chiefly to be kept dry, which are of ſpontaneous growth; And to the end that they may not cleave but dry equally, you are to daub them over with Cow-dung; it ſhould not be drawn through the dew, but in the afternoon, nor to be wrought being very wet or too dry: becauſe the one makes it apt to rot, the other hard to work; nor will it in leſſe then three years be dry enough, to uſe in Plankes, Doores and Windowes. It is convenient for thoſe who are about to build, to inform themſelves from men skilfull in the nature of Timber, what Wood

is fit for such use, and what not. *Vitruvius*, in the Chapter above mentioned, gives good instructions; and so other learned men who have written thereof at large.

CHAP. III.

Of Stone.

SOme are *Natural*, some *Artificial*: The *Natural* are hewn out of the Quarry, and are either to make lime or to build walls; of those which are used for Lime, shall be spoken hereafter; those of which walls are built, are either Marble and hard Stone, or else soft and pliant; Marble, and hard Stone is to be wrought as soon as digg'd; for it will be at that time more easie to work, then when it hath remained a while in the Aire: Seeing the longer they are out of the Quarry, they become the harder, and must suddenly be put in hand; But the softer Stone (especially where its nature and sufficiency is not understood, as when 'tis digg'd in a place from whence formerly none has been taken) ought to be digg'd in *Summer*, and exposed to the Aire, and not to be used within two years; it must be digg'd in Summer, to the end that not being used to winde, raine and frost, it may by degrees grow hard, and inabled to resist those injuries of the weather; and it should be left so long, that those which have been prejudiced may be put in foundations; and the others not spoiled (upon trial) are to be used above ground in Buildings, because they indure longest.

Artificial Stones, are from their form commonly called *Quadrells*; These are made of a chalkie, whitish, and pliable earth; you must by all meanes avoid that which is gravelly and sandy; the earth must be digged in *Autumn*, and tempered in *Winter*, and so they may be well made in the *Spring*; But if necessity forces you to make them in the *Winter* or *Summer*, cover them in *Winter* with dry sand, and in *Summer* with straw, when made, they

they require a long time to dry; and 'tis best that they dry in the shade, so that not only the outside, but the middle and all parts may be equally hardned, which cannot be done in less then two years. They are made bigger or less according to the quality of the building, and the use to which they are intended; Therefore the Ancients made their bricks for publick and great buildings larger then for small and private: The bigger sort ought to be hollowed in many places, that so they may dry and bake the better.

CHAP. IV.

Of Sand.

THere are three sorts of Sand, that is to say, Pit-Sand, River-Sand, and Sea-Sand; Pit-Sand is of all the best, and is black, white, red, or cindry, which is a sort of earth burnt by fire inclosed in the Mountaines, and digg'd up in *Tuscany*. There is also digg'd in *Terra di Lavoro*, in the Territories of *Baia* and *Cuma*, a Sand called by *Vitruvius*, *Pozzolana*, which suddenly knits together in water, and makes building very strong; it hath been found by long experience, that of all Pit-Sand, the white is the worst: And of River-Sand, that from the stream which is found in the falls of water is the best, because it is more purged; The Sea-Sand is worst of all, and blackens and shines like glasse, but that is better which is neerest the shore and bigger. The Pit-Sand, because 'tis fat and tough (but apt to cleave) is therefore us'd in Walls and long Vaults; The River-Sand is very good for the covering, or rough-casting of Walls. Sea-Sand, because 'tis soon wet and soon dry, and moulders away by reason of *the Salt*, therefore is unfit to bear weight; All Sand is best in its kind, if being squez'd and handled it crackles; and if being put upon a white cloth, it neither staines nor leaves it foul; that is bad which mingled with water,

water, makes it dirty and muddy, and which has for a long time been in the Aire, Sun, Moon, and Froſt, becauſe it will retaine much earth, and rotten humour, apt to bring forth ſhrubs and wild fig-trees, which are greatly hurtful to buildings.

CHAP. V.

Of Lime, and how to work it.

STones, whereof Lime is made, are either digg'd out of the Hills, or taken out of the Rivers: All Stones of the Hils are good, which are dry without any moiſture, and brittle, having no material in it; which when it paſſeth the fire ſhall leave the Stone leſſe; Therefore that Lime will be beſt which is made of the hardeſt, ſound, and white Stone, and being burnt remaines a third part lighter then its Stone. There are alſo certain ſorts of Stone, the Lime whereof is very good for the plaiſtring of walls; In the Hils of *Padua* they dig a rugged Stone, whoſe Lime is very good in works which lie open, and in the water, becauſe it preſently hardens, and indures very long. All digg'd Stones are better to make Lime, then the gathered; and from a ſhady and moiſt pit, rather then a dry: the white is better to work then the brown; Stones which are gathered in Rivers and Brookes, that is to ſay, Pebbles, make excellent Lime, and very white, and neat work; Therefore tis generally us'd for plaiſtering of Walls. All Stones, as well of the Hils as Rivers, are ſooner or later burnt, according to the fire which is given them but ordinarily; they are burnt in ſixty hours; Being burnt, wet them, but not pour on the water all at once, but at divers times, and frequently (that they may not burn) till they be well tempered: Afterwards put them in a moiſt and ſhady place without any mixture, onely cover them lightly with Sand; and by how much themore thorowly they are ſteeped, ſo much the more tougher and better they will be: Except thoſe which

are

are made of rough Stones, as the *Paduan*, because they, as soon as they are wet, must be wrought, otherwise they waste and burn away; whence they will not hold, but become useless: for to make the Mortar, you must so mix the Sand, that taking of Pit-Sand, you must put three parts thereof with one of Lime; if River, or Sea-Sand, two parts thereof with one of Lime.

CHAP. VI.

Of Metalls.

THe Metals used in buildings are Iron, Lead, and Copper: Iron serves to make nailes, hinges, and chaines, to fasten the doores, to make doores themselves, grates, and the like workes. It is no where found, and digg'd pure, but when digg'd is purged by the fire; to the end it may be so melted that it may run, and that before it be cool the foulness may be taken away; but after it is purged and cooled, it heats well, and becomes soft, and easie to be wrought and beat out with the hammer. But it will not easily melt, if it be not put again into a furnace made for that purpose; if being red hot it do not work nor yield to the hammer, it wastes and is spoiled. 'Tis a sign of the goodnesse of Iron, if in the mass you see the veines continued straight without interruption, and if the ends of the piece be clean and without soil: Because the said veines shew if the Iron be without *knotts and puffs*; and you may understand the middle by the ends. Being wrought into plates square, or any other figure, if the sides be even, you may conclude 'tis all alike good, having equally endured the hammer.

With Lead they cover stately Palaces, Churches, Towers, and other publick buildings, and gutters and pipes to convey water, and therewith they fasten the hinges and iron work in the Jaumes of Doores and Windowes. There are three sorts thereof, White, Black, and of a colour between both, and by

by ſome called Aſh colour; the black is ſo called, not becauſe 'tis really black, but becauſe being white, with ſome blackneſſe in it; Therefore in reſpect of the white, the Ancients with reaſon gave it that name. The White is more perfect & precious then the black, the Aſh colour is between both: Lead is digg'd either in great lumps found by themſelves, or in ſmall pieces, which ſhine with a certain blackneſſe, or elſe in very thin flakes, amongſt the Rocks, Marble and Stones; All ſorts of Lead will eaſily run, becauſe with the heat of the fire it melts before it is red hot: but put it in to a very hot furnace it looſeth its nature and ſtrength; for one part is changed into Litharge, and the other into droſſe; of theſe ſorts of Lead the black is ſoft, and therefore eaſily wrought with the hammer, and dilates much, and is very heavy. The White is harder and lighter, the Aſh colour is much harder then the White, and of middle weight between both.

With Copper ſometimes they cover publick buildings; and the Antients made nailes or bolts, which faſtned in the ſtones above and below, kept the ſtones from falling out of order, and the claſpes or hookes placed to hold two ſtones together; and they uſed theſe nailes and claſpes, becauſe that buildings which can't poſſibly be made without many pieces of ſtones, may (by being thus joyned and bound together) as it were become one ſtone, and ſo more ſtrong and durable. They alſo made nailes and claſpes of Iron, but more often of Copper, becauſe they will laſt longer, not being ſo ſubject to ruſt. Alſo they made Letters for Inſcriptions, which they placed on the borders of buildidgs; And we read that of this metal were the hundred famous gates of *Babylon*; and in the Iſles of *Cades*, the two Pillars of *Hercules* eight cubits high: that is eſteemed the beſt which burnt and extracted from mineral, by fire, is red, inclining to yellow, *of a good grain, and full of holes*, for that is a ſign 'tis well purged and free from droſſe: Copper may be heated like Iron, and made liquid, ſo that it may be caſt; But in extream hot furnaces, it will not indure the force of the flame, but totally conſume; Although it be hard, nevertheleſſe it ſubmits to the hammer, and dilates it ſelf into thin Leaves; it's beſt preſerved by Tarr; and although it doth not ruſt like Iron,

yet

yet it hath a kind of ruſt which is called *Verdegreace*, eſpecially if it touch ſharp and liquid things; of this metal mixed with Tin, or Lead, or Latten (which is alſo Copper) and coloured with *Lapis Calaminaris*, is made a metal commonly called Braſs; which often times Architects do uſe, as in Baſes, Pillars, Capitels, Statues, and ſuch like. In *Rome* are four Columns of Braſſe (at St. *Giovanni Lateranno*) of which one only has it's Capitel, and were made by *Auguſtus*, of metal which was taken from the ſtemms of ſhips, which he took in *Egypt* from *M. Antonio*; There remaines alſo in *Rome*, to this day, four ancient gates, which are thoſe of the *Rotunda*, which formerly was the *Pantheon*; That of St. *Adriano*, which was the Temple of *Saturnus*; That of St. *Coſmo* and *Damiano*, which was the Temple of *Caſtor* and *Pollux*, or rather of *Romulus* and *Remus*; And that which is in St. *Agnes*, without the gate *Viminalis*; But the moſt beautiful of all theſe, is that of St. *Maria Rotunda*, wherein thoſe Ancients did endeavour to imitate by art that kind of *Corinthian* metal, in which the natural yellow of Gold prevailed: for we read that when *Corinth* was deſtroyed and burnt, (which now is called *Coranto*) Thus they melted and mixed in one maſs, Gold, Silver, and Copper, and fortune tempered, and made the mixture of three ſorts, which afterwards was called *Corinthian*: In one of them the Silver prevailed, whence it remained white, and very near it in luſtre: In another the Gold prevailed, and remained yellow, and of a Gold colour: And the third was, where all theſe three metals were of an equal temperament, and theſe ſpecies have been ſince divers wayes imitated; Hitherto I have diſcourſed of thoſe things, ſeeming moſt neceſſary to be conſidered and prepared before building; It now remaines that ſomething be ſaid of foundations, the materials whereof being prepared, the work may be proceeded on.

CHAP. VII.

Of the Qualities *of Ground, wherein Foundations are to be laid.*

THe Baſe of the building is that which we call the Foundation, which is to ſay, the part which is under ground, upholding the reſt of the building that is above ground; Therefore of all the errours which do happen in building, thoſe are the moſt pernicious which are committed in the foundation, becauſe they bring with them the ruine of the whole Fabrick, nor can without great difficulty be amended; Whence the Architects ought to uſe their utmoſt diligence: Becauſe in ſome places they have a natural foundation, and in other places it is neceſſary to uſe Art.

A Natural Foundation is when we build on Stone, Sand, or Gravel; for theſe, without digging, or other helps of Art, are of themſelves excellent foundations, and moſt fit to uphold the greateſt building both on Land and in Water: But if nature affords not a foundation, it muſt be attempted by Art, and then the place you have to build on, is either a *ſolid* earth, or a gravelly, ſandy, moſſie, ſoft, and mooriſh place. If the earth be faſt and firm, you may dig ſo far as to a diſcreet Architect may ſeem requiſite for the quality of the building, and ſoundneſſe of the earth: and (when you intend not to make Cellars, or other under-ground Offices) your depth is to be a ſixth part of the height of the building; To know this firmneſs, obſervation from the digging of Wells, Ciſterns, and ſuch like, will help well; and it's alſo known by Hearbs growing there, if they uſually ſpring up onely in firm and faſt grounds; and beſides, 'tis a ſign of firm ground, if a great weight thrown thereon, it neither ſounds nor ſhakes; And from the Report of Drum-heads being ſet on the ground, and lightly touched, it does not reſound again, and if water put in a veſſel doth not ſhake; The neighbouring places will alſo give you to underſtand the

faſtneſs

faſtneſſe and firmneſſe of the earth : But if the place be ſandy or gravelly, obſerve whether it be on land or in water; for if it be on land, you muſt take notice what has been before directed, concerning faſt ground ; And if you build in a River, the Sand and Gravel is altogether uſeleſſe, becauſe the water with it's continual ſtream and flood often changes its bed : Therefore dig till you come to a bottom ſound and firm; or if that be difficult, dig ſomewhat in the Sand and Gravel, and then place piles whoſe ends may reach to the ſound and good earth, and upon thoſe you are to build : But if you are to build upon a moſſie, and looſe ground, then you muſt dig till you find ſound earth, and therein alſo ſo much as the bigneſſe of the wals and the greatneſſe of the building require.

This ſound ground (and fit to uphold building) is of divers ſorts ; for (as *Alberti* well ſaith) ſome where ſo hard, as *'tis ſcarce to be cut with Iron*; ſome where very ſtiff, ſome where, blackiſh, ſome where whitiſh, (which is accounted the weakeſt) ſome where like chalk, ſome where ſandy ; of all theſe the beſt is that which is cut with moſt labour, and when wet, doth not diſſolve into dirt.

You ſhould not build upon a ruine or old foundation, if firſt of all you know not it's depth, and whether it be ſufficient to bear the building ; But if the earth be ſoft and ſinks much, as in mooriſh grounds, then you muſt place piles, whoſe length muſt be an eight part of the height of the wall, and in thickneſſe a twelfth part of their length : The piles muſt be placed as cloſe as one can ſtand by the other, and are to be rammed in with blowes, rather quick then heavy, ſo that the earth may the better conſolidate and faſten. You muſt place the piles not only under the out-walls, upon the trench or gutters, but alſo under the inner-walls, which divide the building : for if you make the foundation for the inner-walls different from thoſe without, then laying Beames along one by th' other, and others athwart them above ; often times it happens, that the inner-walls falls down, when thoſe without being placed on piles ſtir not : Whence all walls come to cleave, the which renders the building ruinous, and is very uncomely to look on ; Wherefore you muſt avoid this danger, making the piling work

of lesse charge; for according to proportion of walls, the piles in the middle may be placed thinner then them without.

CHAP. VIII.

Of Foundations.

FOundations ought to be twice so thick as the walls to be raised thereon, and therein the quality of the earth, and the greatnesse of the building is to be regarded, making them more large in soft and looser ground, and where there is a great, weight to be sustained. *The plain of the Trench* must be Level, so that the weight may press equally, and not inclining to one part more then another,, may prevent the cleaving of the walls. For this reason the Ancients us'd to pave the Plain with *Tivertine*, and we lay Plankes and Beames and build thereon.

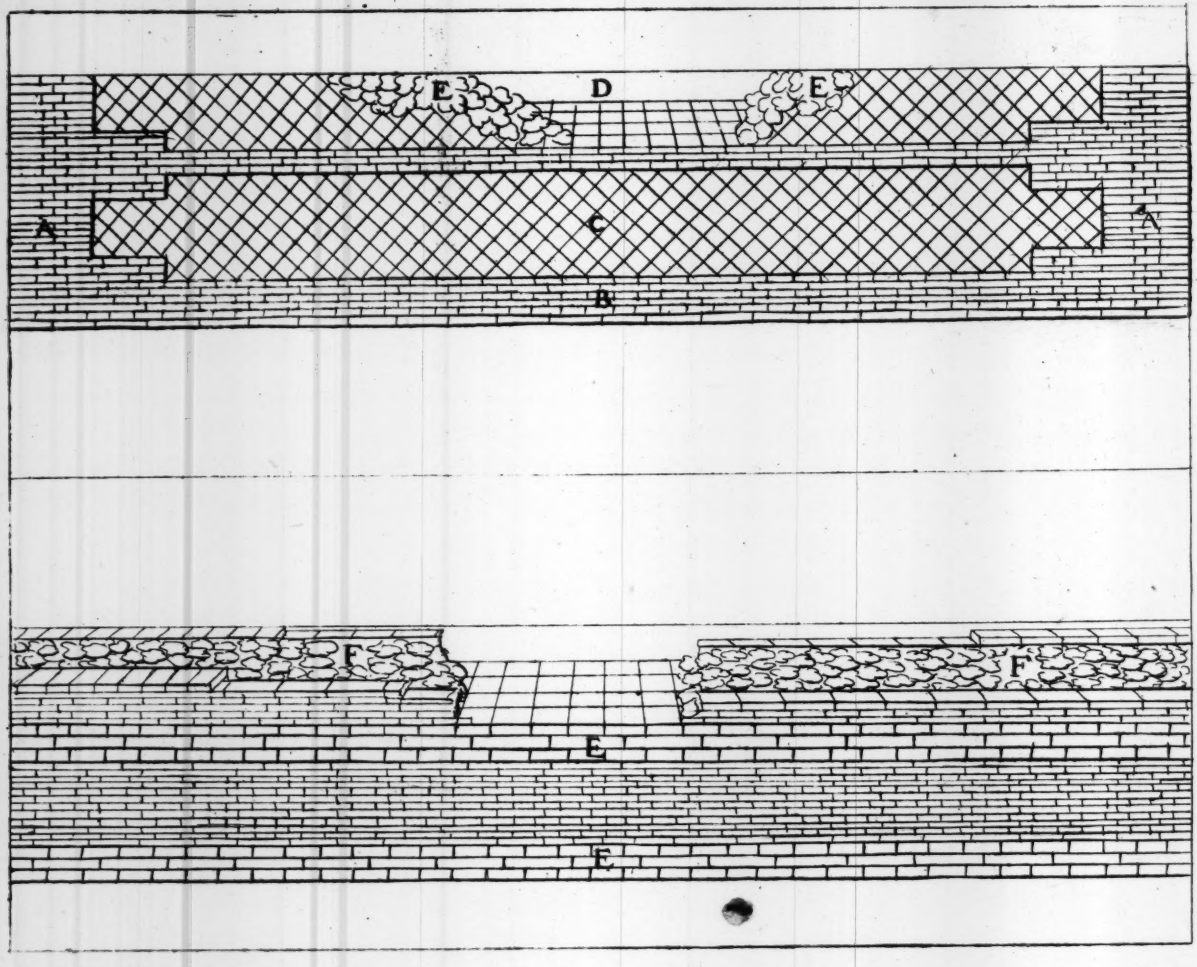
Tivertine, a certain stone brought from the River *Tiber*.

Foundations are made sloping, that is to say, to diminish as they rise; Yet so, as that there may be so much left on one side, as on the other: so that the middle of that above may fall, perpendicularly upon the middle of the lower work, which must be also observed in the diminution of walls above ground; because by this means the building becomes much stronger, then by making the diminutions any other way.

There is some times made (especially in mooriſh grounds where there is need of piles) to avoid charge, Foundations discontinued but with certain Vaults, upon which they afterwards build. In great buildings 'tis very commendable to make vents through the body of the walls, from the Foundation to the Roof, because they let forth the wind (which is very prejudicial to buildings) lessen the charge, and are of no small convenience, if in them you make winding staires from the bottom to the top.

CHAP.

UMI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CHAP. IX.

Of the Fashion of Walls.

THe Foundations being laid, it remaines that we treat of the Superstructures. The Ancients had six sorts of Walls; One called *Reticolata*, or *Net-work*: another of *Quadrells*, or *Brick*: a third, of *Cement*, which is of Ruff stones from the Hills or Rivers; a fourth of various stones; a fifth of squared stones; the sixth *Riempiuta*, which is also called Coffer-work; Of the Net-work there is no use at all in these dayes; but because *Vitruvius* relates it was common in his time, I do here put also that designe. They made the Coignes and Corners of their building of *Quadrells*, and every two foot and half took up three *Courses* of *Quadrells*, which bound the whole thickness of the Wall.

A. *Coignes, or Corners of Quadrells.*
B. *Courses of Quadrells, which binde the whole Wall.*
C. *The Net-work.*
D. *The Courses of Quadrells, through the thickness of the Wall.*
E. *The inner part of the Wall made of Cement.*

Walls of *Brick*, or *Quadrells*, both those about Cities, and other great Edifices, must be so made, that the inside and outside may be of *Quadrells*, and in the middle filled up with Cement, and with brick, earth, and stone, rammed together; and to every three foot in height; there must be three Courses of Quadrells of the biggest sort, which may take the whole breadth of the Wall. And the first Course must be laid with the length inward, that the lesser part of the brick be exposed. The second, the length laid side wayes, and the third as the first; of this sort are the Walls of the *Rotunda* in *Rome*, and the Bathes of *Diocletian*, and all other ancient buildings which are there.

E. *The Courses of Quadrells, which binde the whole Wall.*
F. *The middle part of the Wall made of Cement, between one course and the other, and the outward Quadrells.*

The

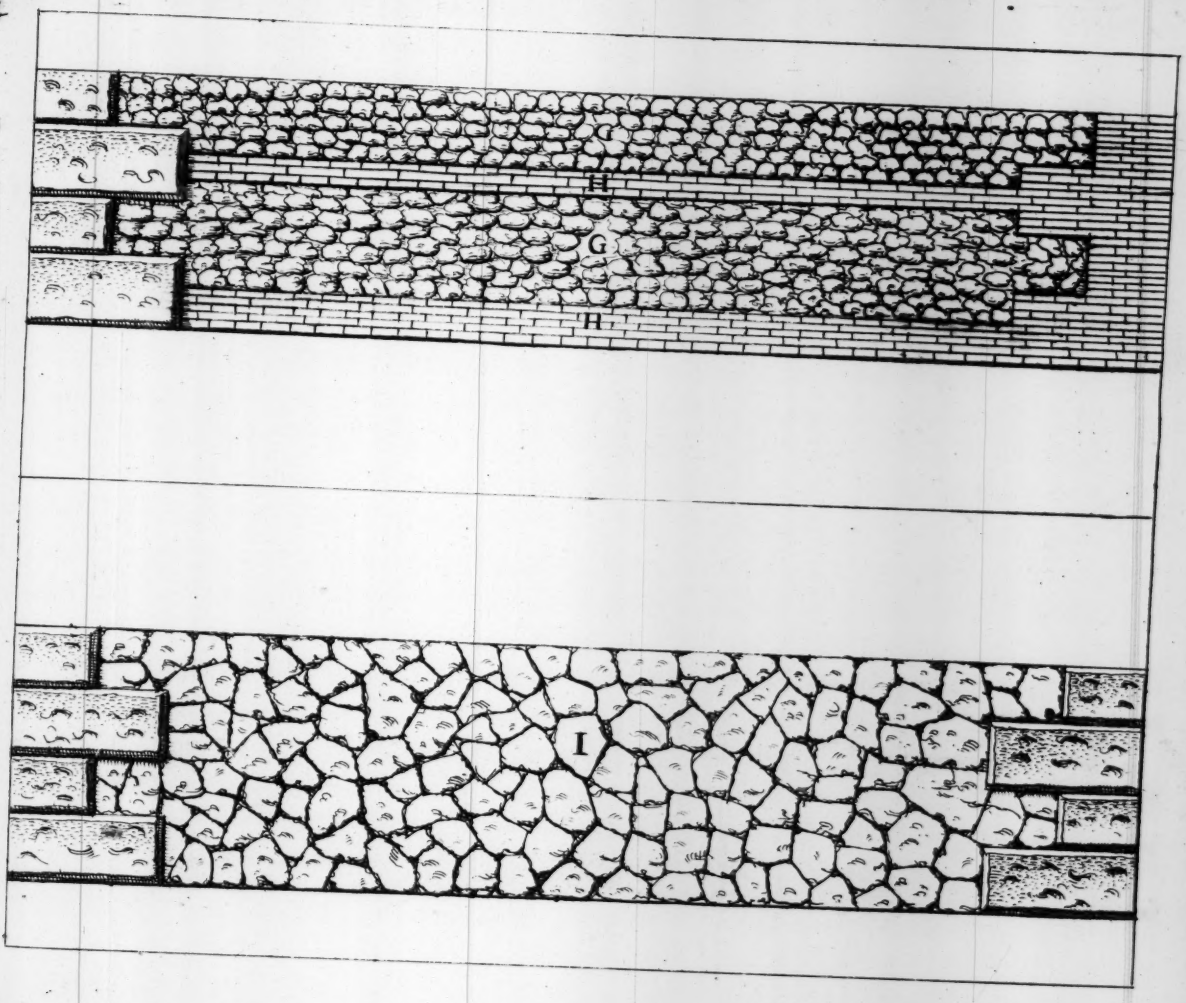
The Walls of *Cement* muſt be made ſo, that to every two foot, at leaſt, there be three Courſes of *Quadrells or Brick*; And that the *Quadrells or Brick*, be prepared according to the manner aforeſaid. Such are the walls of *Turin* in *Piedmont*, which are made of River pebbles ſplit in the middle, which being placed with the ſplit ſide outwards, make very even and ſmooth work. The Walls of the *Arena* of *Verona* are likewiſe of *Cement*; and there are three Courſes of *Quadrells* to every three foot; And in like manner are made other Ancient Edifices, as appears in my Books of Antiquities.

G. *Cement or River Pebbles.*
H. *Courſes of Quadrells, which binde the whole Wall.*

The Walls of *irregular ſtones* were ſo called, becauſe they were made of Stones of unequal ſides and Angles; And to make theſe Walls, they uſed a plumb Rule, which applied to the place where the Stone was to be put, ſerved to place them ſtraight and even: Thereby to try, time after time, if the Stone ſtood right in the deſigned place; Of this ſort may be ſeen Walls at *Preneſte*, and Ancient ſtreets were paved in this manner.

I. *Irregular Stones.*

At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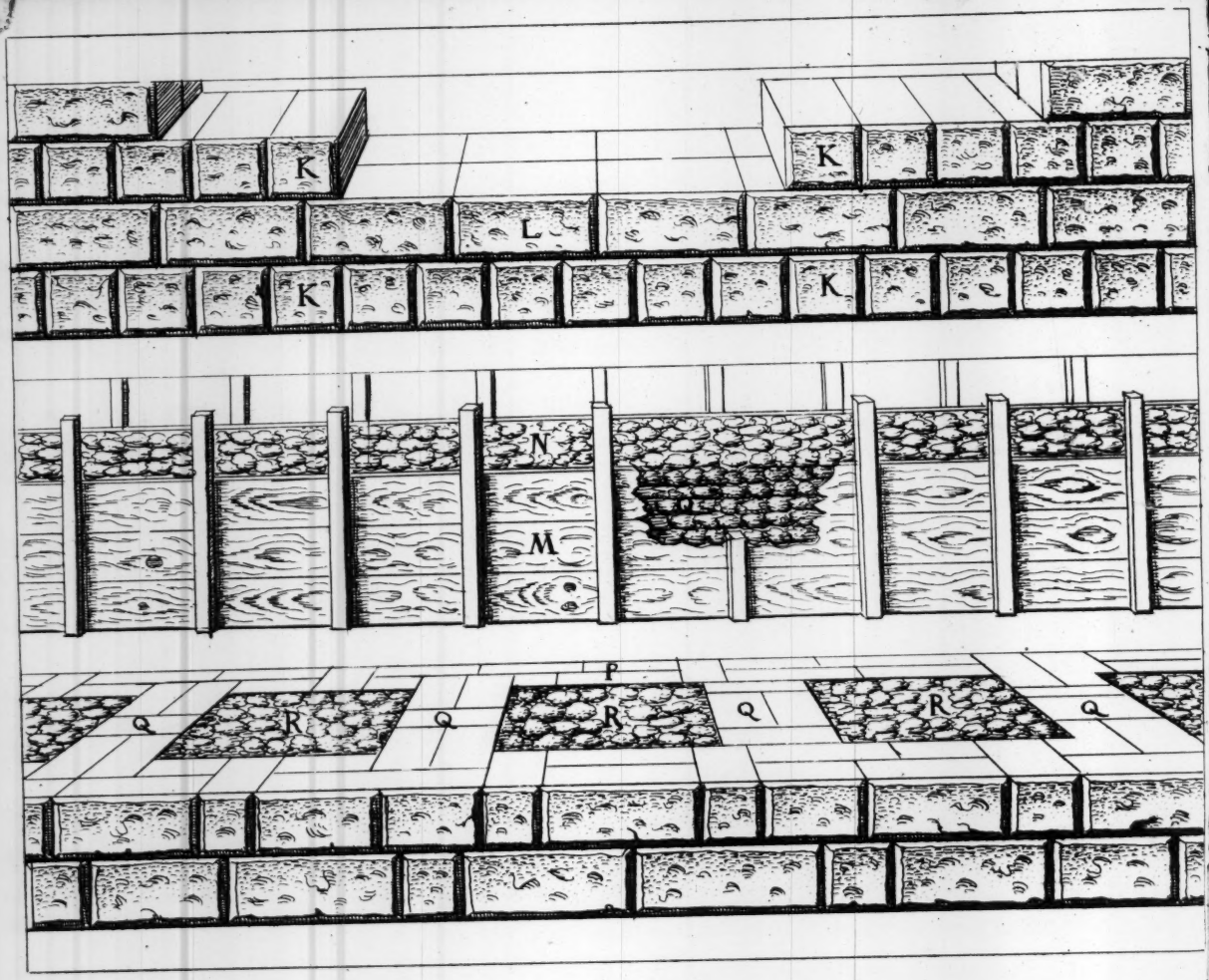
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At *Rome* may be ſeen Walls of ſquared Stones, where was the *Piazza*, and the Temple of *Auguſtus*, inwhich they locked in the leſſer Stones with Courſes of greater.

K. *Courſes of leſſer Stones.*
L. *Courſes of bigger Stones.*

The manner *Riempiuta*, or filled Walls, which is alſo called Coffer-work, which the Ancients did uſe; Taking Plankes, and placing them edge-wiſe, allowing ſo much ſpace as they would have the thickneſſe of the Wall, filling it with morter, and ſtones of all ſorts mingled together; and ſo they went on from Corſe to Courſe. There is ſeen ſuch like Walls at *Sermion*, upon the Lake *De Grada*.

M. *Plankes put edge-wiſe.*
N. *The inner part of the Wall.*
O. *The face of the Wall, the Plankes taken away.*

Of this kind may be called the ancient walls of *Naples*, which had two walls of ſquared Stones four foot thick, and ſix foot diſtant th' one from the other; thoſe walls were bound together, with other croſſe Walls, and the *Caſes* which were between the Traverſe Walls and the Out Walls were four foot ſquare, and were filled up with Stones and Earth.

P. *The Outward Stone Wall.*
Q. *The Traverſe Walls.*
R. *Caſes filled with ſtones and Earth.*

Theſe were the formes of which the Ancients did ſerve themſelves, and the foot-ſteps thereof are yet to be ſeen; whence it may be concluded, that VValls of what ſort ſo ever ought to have ſome Tires or Courſes, which are like ſinewes that hold faſt

faſt all other parts together, which chiefly may be obſerved when Walls are made of Brick: For the ſtructure through age falling a ſunder in the middle, the Walls may not become ruinous, as hath happened, and is ſeen in many Walls, eſpecially on that ſide which reſpects the North.

CHAP. X.

Of the Method which the Ancients did practiſe in making their Stone Buildings.

BEcauſe it happens, that ſometimes buildings are made (the whole, or good part) of Marble, or ſome other great ſtones; I think it convenient, in this place, to acquaint you what the Ancients did in ſuch caſes; For we may obſerve, in their work, that they were ſo diligent in joining their ſtones together, that in many places their connexion can ſcarcely be perceived. And beſides, the Beauty, Firmneſſe, and Duration of the Fabrick, is very much to be regarded.

And for as much as I can underſtand, they firſt ſquared and wrought the ſides of the ſtones, which were to be placed one upon the other, leaving the other ſides rough, and ſo uſed them; whereupon the edges of the ſtones were beyond the ſquare, and might manage them better, and more variouſly attempt to place them right without danger of breaking, then if they had been ſquared on all ſides before; For when the edges are made ſquare, or leſs then ſquare, they are very weak and ſubject to accidents: In this manner they made all buildings rough, or, as one may ſay, ruſtick; And that being done they go on working and poliſhing the face of the ſtone which is to be ſeen. It is true that the Roſes which are between the *Modilions*, and other ſuch like ornaments of the Cornich, could not commodiouſly be done when the ſtones were fixed, therefore they made them while they

they were on the ground. This is well atteſted by many ancient buildings, where may be ſeen many ſtones rough and unpoliſhed. The Arch by the old Caſtle in *Verona*, and all other the Arches and buildings there, were done in the ſame manner; which is eaſily made out by one curious in obſerving the markes of their Tooles, that is to ſay, the manner how the ſtones were wrought. The pillars of *Trajan*, and *Antonine* in *Rome*, we e ſo made, nor could they otherwiſe have ſo exactly joyned the ſtones, that might ſo cloſely meet where they go acroſſe the heads, and other parts of the figures. And the ſame may be ſaid of the other Arches which are there.

And if the workes were very great, as the *Arena* of *Verona*, the Amphitheatre of *Pola*, and the like, to ſave charge and time, which they would have required, they wrought only the Impoſts of the Arches, Capitells, and the Corniches; and the reſt they left Ruſtick, having only regard to the fair front of the building. But in Temples, and other buildings, which required curioſity, they ſpared no paines in the working them, and glazing and ſmoothing even the very fluces of the Collumnes, and poliſhing them diligently. Therefore, in my Judgement, you ſhould not make Walls of Brick in the Ruſtick manner, much leſſe Mantles of Chimnies, which require curious work; For beſides the unhandſomneſſe, 'twill happen that they will ſplit and divide a ſunder, which naturally ought to be intire; But according to the greatneſſe and quality of the building, you may make them Ruſtick or Polite: And in a work which requires altogether neatneſſe, we need not do as the Ancients uſed, with Reaſon, and neceſſitated by the greatneſſe of their workes.

CHAP. XI.

Of the Diminution of Walls, and of their parts.

IT is to be obſerved, that by how much the higher the Walls are, ſo much the narrower they muſt be; Therefore that part which is above ground is to be one half thinner then the foundation, and the ſecond ſtory a half brick thinner then the firſt; and ſo continue till you come to the top of the building, but with diſcretion, that it be not too weak. The middle of the upper Wall ought to fall direct to the middle of the Lower, that ſo all the Walls be in a Pyramidal form. But if you would make a ſuperficies, or face of a Wall, above, directly over that below, it muſt be on the inner part; becauſe the raftrings of the Floores, the Vaults, and other ſupporters of the building, may not ſuffer the Wall to fall or give way. The diſcharged part, which is on the outſide, muſt be ſupplyed with a Border or Corniche, incompaſſing the whole building, which will be an ornament and faſtning to the whole Fabrick.

The Angles, becauſe they partake of both ſides, and are to keep them upright and faſt together, muſt be very ſtrong, and held with long hard ſtones, as it were with armes; Therefore the Windows and Apertures muſt be as far from them as may be; or at leaſt ſo much ſpace muſt be left between the Aperture and the Angle, as is the breadth of the Aperture.

Having ſpoken of meere Walls, 'tis convenient to paſſe to the ornaments, the greateſt whereof are the Columnes when they are meetly placed, and have fair proportion to the whole Fabrick.

CHAP. XII.

CHAP. XII.

Of the Five Orders used by the Ancients.

FIve were the Orders among the Ancients, that is to say, the *Tuscan*, *Dorick*, *Ionick*, *Corinthian*, and *Composita*, which ought to be so disposed in the building, that the strongest be set lowest; for then 'twill be more capable to bear the weight, and the building will have a more sure foundation: Wherefore they alwayes place the *Dorick* under the *Ionick*, the *Ionick* under the *Corinthian*, and the *Corinthian* under the *Composita*; the *Tuscan*, as being rude seldom is used above ground, unlesse in a building of one order onely, as in Town-houses, or in vaste buildings, as Amphitheaters and such like, where being many orders, this instead of the *Dorick* is placed under the *Ionick*; and if you leave out one of them, and place, for example, the *Corinthian* immediately over the *Dorick*, which may be done according to the Rule aforesaid, provided alwayes, that the more solid be the lowest. I shall set down, particularly, the measures of each of these Orders; not so much according to the Doctrine of *Vitruvius*, as according to my own observations in Ancient buildings; But first I shall say those things which belong to all in general.

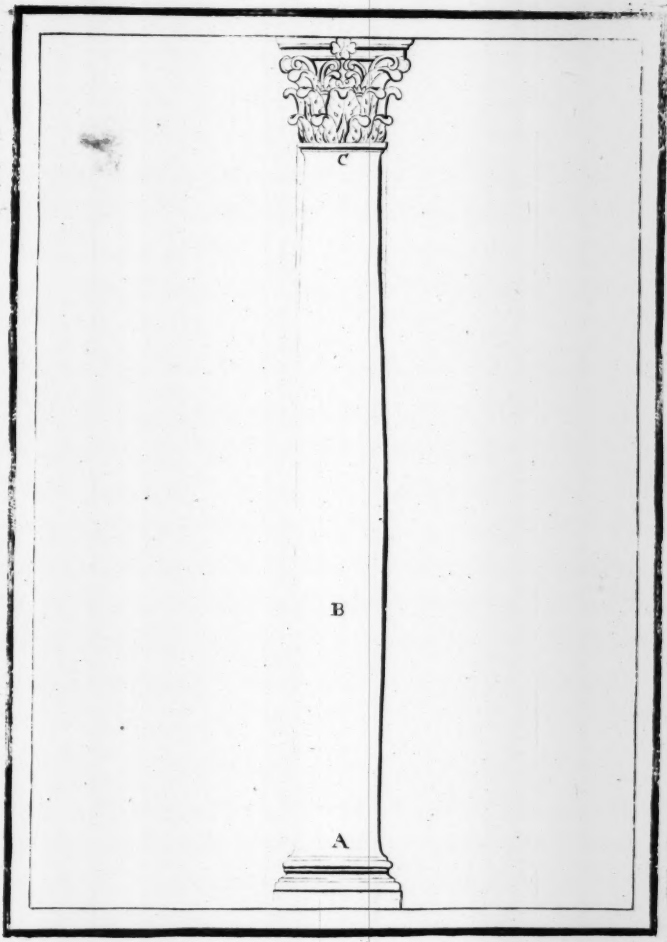
CHAP. XIII.

Of the swelling of Columnes, and their diminutions of Inter-columnes and Pillasters.

COlumnes of every Order must be so formed, that the upper part must be lesser then the lower, and the middle somewhat thick; In diminishing it must be observed, that by

how much longer the Columnes are, ſo much the leſſe muſt they be diminiſhed, in regard that the height of it's ſelf workes the effect of diminiſhing by the diſtance; Therefore if the Column be 15. foot high, the Diametre of the Column below muſt be divided into $6\frac{1}{2}$. parts, and the Diametre thereof above ſhall be $5\frac{1}{2}$. of thoſe parts. If from 15. to 20. the Diametre below muſt be divided into 7. parts, and $6\frac{1}{2}$. muſt be the thickneſſe of the upper part; So likewiſe thoſe which are from 20. to 30. the Diametre below muſt be divided into 8. parts, and 7. muſt be the Diametre of the upper part, and ſo the Columnes which are higher are to be diminiſhed proportionably by their ſeveral parts, as *Vitruvius* ſhews in his Second Chapter of his Third Book. But how the ſwelling is to be made in the middle, we have no more to ſhew from him then a bare promiſe; and therefore many have written variouſly thereof. I am wont to make the profile of the ſaid thickneſſe in this manner; I divide the body of the Column into three equal parts, and leave the lower third part perpendicular, at the end of which I lay a long thin rule as long as the Column, or a little more, and move that part which reacheth from the third part upwards, and bend it till the end touch at the point of the diminution, at the top of the Column under the *Collarino* or *Aſtragal*; according to that bending I proceed, and ſo the Column becomes ſomewhat ſwelled in the middle, and appears very handſome; And although I could not have contrived (beſides this) a form either ſhorter or more expedient, or that might be more acceptable; I am yet more confirmed in this my opinion, ſince it hath ſo much pleaſed *Pr. Cattaneo*, that (I having told him of it) he hath put it into one of his Workes of Architecture, with which he hath not a little Illuſtrated this profeſſion.

A. B. *The third part of the Column which is perpendicular.*
B. C. *The two thirds diminiſhed.*
C. *The point of the Diminution under the Collarino or Aſtragal.*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The Inter-Columnes, that is to say, the spaces between the Columnes, may be made of a Diametre, and ½. of the Column, and the Diametre is to be taken at the lower part of the Column, of two Diametres, of two and ½. of three, and sometimes of more. But the Ancients were not wont to allow more then three Diametres of the Column, except in the *Tuscan* Order, in which the Architrave is wont to be of wood; They made the Inter-columnes very large, not lesse then a Diamtre and half, and this space they allowed sometimes, especially when they made the Columnes very bigg; But those Inter-columnes were most preferred that were of two Diametres, and ½. of the Column; and they accounted this the most noble and beautiful manner of the Inter-columnes.

And you ought to take notice, that between the Inter-columnes and the Columnes; there ought to be proportion and correspondence, for leaving too much vacancy between small Columnes, you will take away great part of their beauty; because the great quantity of aire that will be between them will diminish very much their thickness; And on the Contrary, leaving too little space to the great Columnes, by the streightness and narrowness of the spaces they will appear gouty, and very ungraceful: Therefore if the spaces exceed three Diametres, you must make the Columnes in thickness a seventh part of their height, as I observe hereafter in the *Tuscan* Order; But if the spaces shall be three Diametres, the length of the Column must be 7½. or eighe, as in the *Dorick* Order; And if 2½. the length of the Column must be 9. Diametres, as in the *Ionick*; If 2. the length of the Column must be 9½. as in the *Corinthian*. Lastly, if 1½. the length of the Column must be 10. as in the *Composita*. Concerning these Orders, I have took this care, that they may be examples for all other Inter-columnes, which *Vitruvius* intimates in the Chapter aforesaid.

In the front of Buildings, the Columnes ought to be an even number, so that the middle Inter-column may be made bigger then the rest, that the Doores and Entries may be the better seen; which usually are placed in the middle: And thus much for Pillar-work only.

But if Galleries be made with Pillasters, they must be so dis-

posed,

poſed, that the Pillaſters be not leſſe then a third of the vacancy between Pillaſter and Pillaſter, and thoſe at the corners muſt be two thirds bigger then the other, that ſo the Angles of the Fabrick may be firm and ſtrong; And when they are to ſupport an extraordinary great weight, as in very great buildings, then they muſt be the half of the vacancy: as thoſe of the Theatre of *Vicenſa*, and the Amphitheatre at *Capua*; or elſe two thirds, as thoſe of the Theatre of *Marcellus* in *Rome*, and of the Theatre of *Ogubas*, which now belongs to *Sig. Lodovico de Gabrielli*, a Gentleman of that City. The Ancients alſo made them ſometimes as large as the whole vacant, as in the Theatre of *Verona*, in that part which is not upon the Hill. But in private buildings, they are not to be made leſſe then a third of the vacant, nor larger then two thirds, and they ought to be ſquare; But to ſave charge, and to make room to walk more freely, they may be made leſſe in the flank then in the front.

And to adorn the Frontiſ-piece, you may put in the middle of the front half Columnes, or other Pillaſters which may bear up the Corniche, which ſhall be upon the Arches of the Gallerie; and they muſt be as large as their height ſhall require, according to their ſeveral orders, as in the enſuing Chapters and deſignes may appear; For the underſtanding whereof (that I may not repeat the ſame thing often) you may underſtand, that I in the dividing and meaſuring the ſaid Orders, would not take a certain and determinate meaſure, which is peculiar to any City, as Cubit, Foot or Span; well knowing, that Meaſures are as various, as the Cities and Countries. But in Imitation of *Vitruvius*, who divides the *Dorick* Order with a Meaſure taken from the thickneſſe of the Column, which is common to all, and by him called a *Module*: I will alſo ſerve my ſelf with ſuch a Meaſure in all the Orders, and the *Module* ſhall be the Diametre of the Column, taken at the Baſe, divided into 60. parts; except in the *Dorick*, in which the *Module* is to be the half Diametre of the Column, and is divided into 30. parts: for ſo it falls more commodious in the Compartiments of the ſaid Order. Wherefore every one may ſerve himſelf (making the *Module* greater or leſſer, according to the quality of the Fabrick) with the proportions and profiles deſigned convenient to every Order.

CHAP.

CHAP. XIV.

Of the Tuscan *Order.*

THe *Tuscan* Order, according to that which *Vitruvius* writes of it, and is so indeed, is the most simple and intire of all the Orders of Architecture: because it retaines the most of Antique, and wants all those Ornaments which renders the others so pleasant and agreeable. This had its original in *Tuscana*, a place very remarkable in *Italy*, whence the Name is derived.

The Column with it's Base and Capitel, ought to be in length seven Modells, and at the top are diminished a fourth part of their Diametre, having occation of a row of Columnes of this Order only, you may make the Inter-columnes very large; Because the Architraves may be of wood, and will be very convenient for Country use, for the passage in and out of Carts, and other Country conveniences; and besides, the charge will be lesse; But if you make Gates or Galleries with Arches, you must observe the Measure that I have marked in the design, in which you may observe the Stones so disposed and joyned together, as when the whole work is of Stone; The which I have also directed in the designes of the other four Orders.

And this way of disposing and fastning the Stones, I have derived from many Ancient Arches, as appears in my Bookes of Arches; and herein I have used great diligence.

A. *Architrave of Wood.*

B. *The ends of the Summers which beare up the projecture of the Cornice.*

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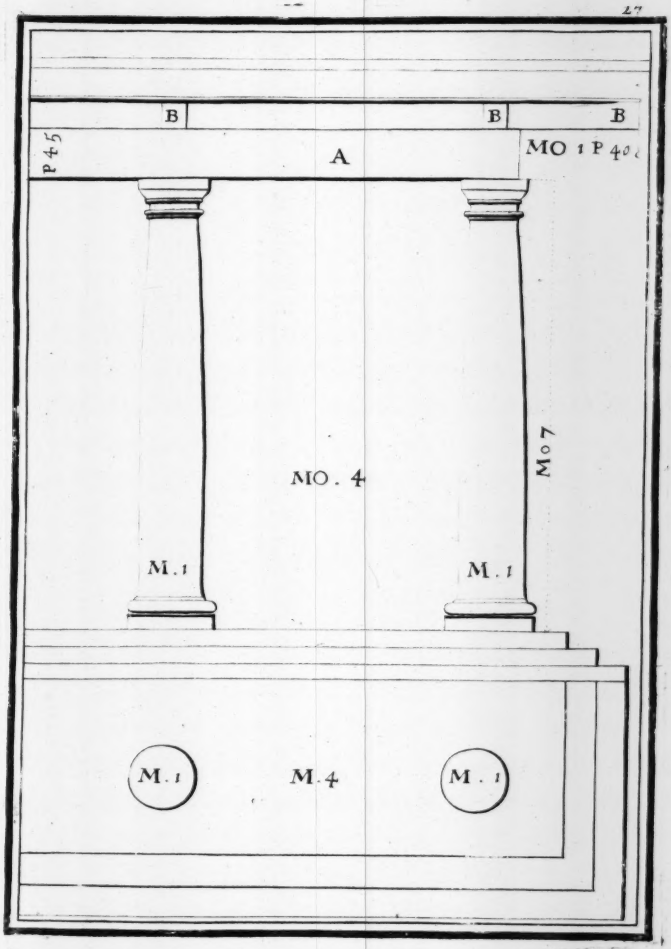
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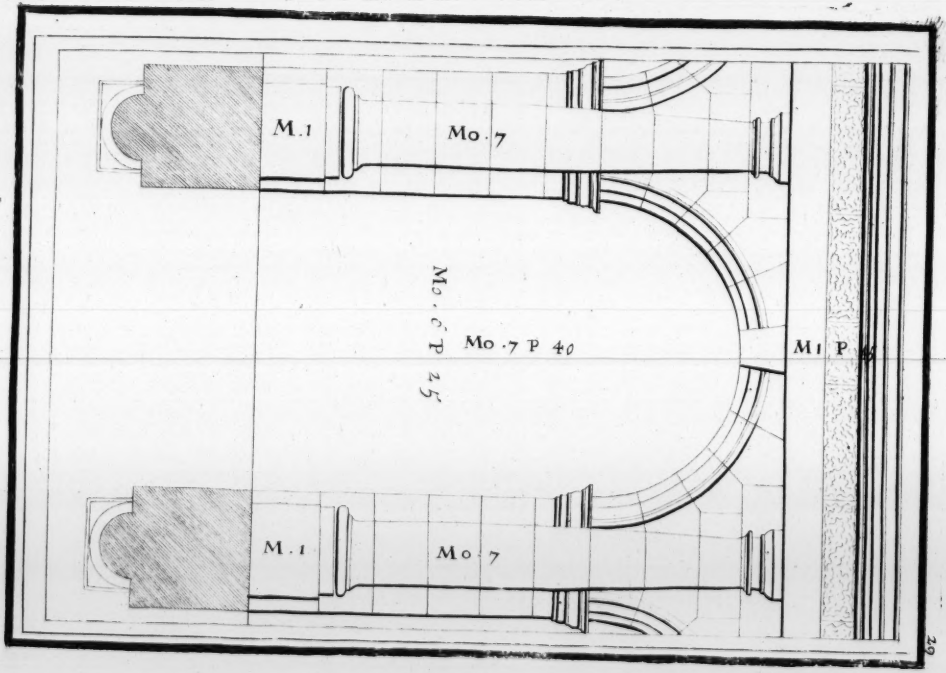
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M.1
Mo.7

The *Pedeſtals* which are made under the Columnes of this Order muſt be the height of one Model, and made plain. The height of the Baſe is to be the half Diametre of the Column. This height muſt be divided into two equal parts; one is given to the *Orlo*, or *Plinth*, which muſt be made round; the other is divided into four parts; One for the *Liſtella*, or *Cincture*, which may be made a little leſſe, and is alſo called *Cimbia*; and in this Order onely is part of the Column, the other three are for the *Torus*. The *Projecture* of this Baſe is a ſixth part of the Diametre of the Column below. The *Capitel* is the height of half the Diametre of the Column below, and is divided into three equal parts. One is given to the *Abacus*, which from it's form is commonly called *Dado*, or *Dye*. The other to the *Ouolo*, or *Echinus*, and the third is divided into ſeven parts, of one is made the *Leſtella* under the *Ouolo*, and the other ſix remaine to the *Collorino*, or neck of the Column. The *Aſtragal* is double, the height of the *Liſtella* under the *Ouolo*, and the Centre thereof, is made upon the line, which falls plum upon the ſaid *Liſtella*, and upon the ſame line doth fall the projecture of the *Cimbia*, which is as thick as the *Liſtella*. The *Projecture* of the *Capitel* anſwers to the body of the Column below; It's Architrave is made of Wood as high as broad; and the bredth ought not to exceed the body of the Column at the top. The *Summers* which carry out the *Eaves*, projecteth a fourth part of the length of the Column. Theſe are the Meaſures of the *Tuſcan* Order, as *Vitruvius* teacheth.

A. *Abacus*

A. *Abacus.*

B. *Echinus.*

C. *Hypotrachelium, or frize of the Capitel.*

D. *Astragal.*

E. *Body of the Column above.*

F. *Body of the Column below.*

G. *Annulet Ceincture, or Listella.*

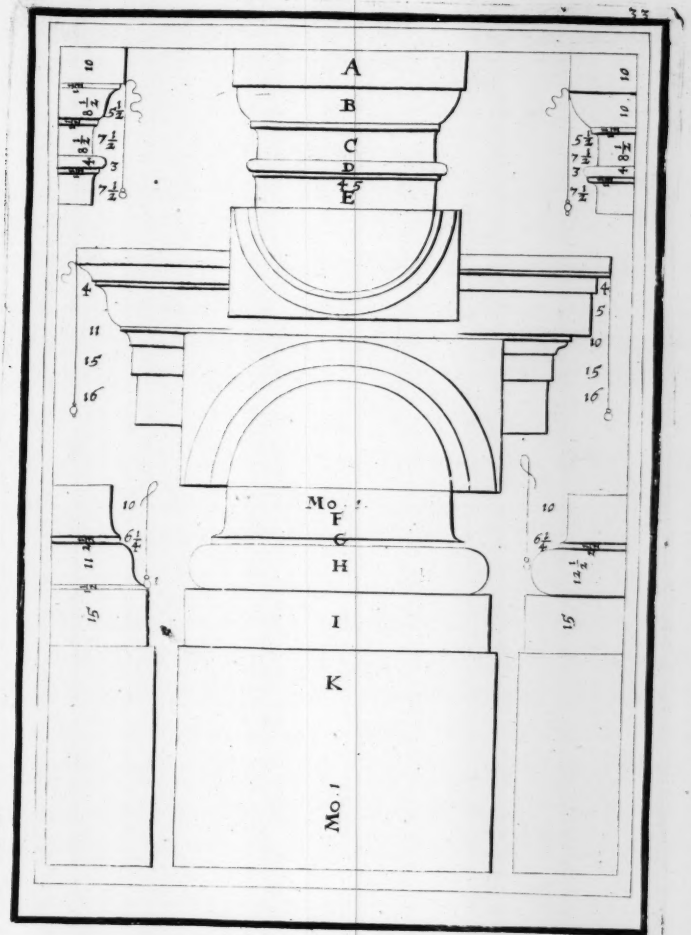
H. *Torcus.*

I. *Orle, or Plinth.*

K. *Pedestal, or Stylobatum.*

The *Profiles* which are placed by the plain of the Base and *Capitel*, are the Impofts of the Arches.

But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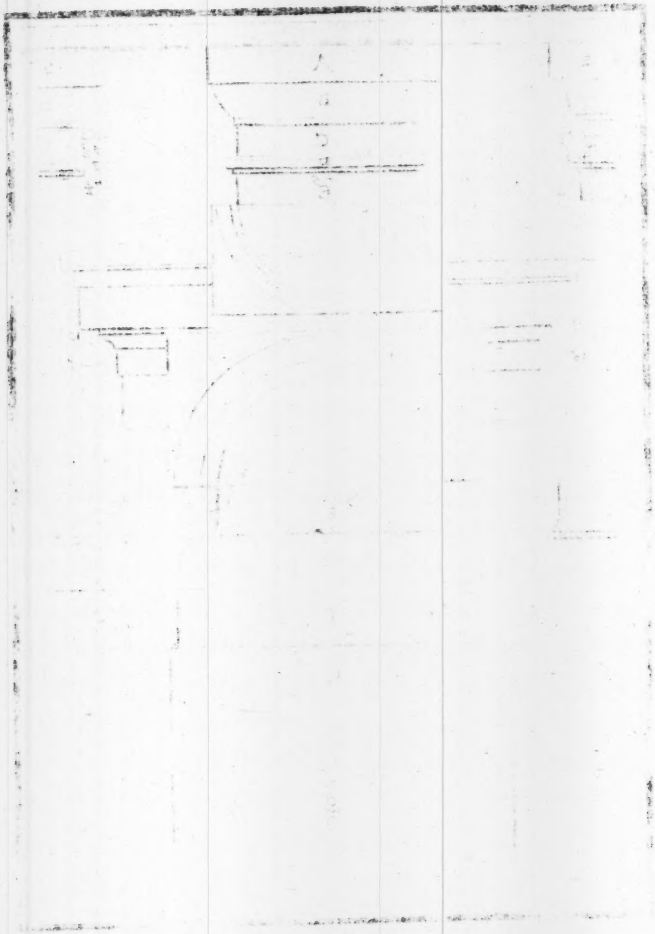
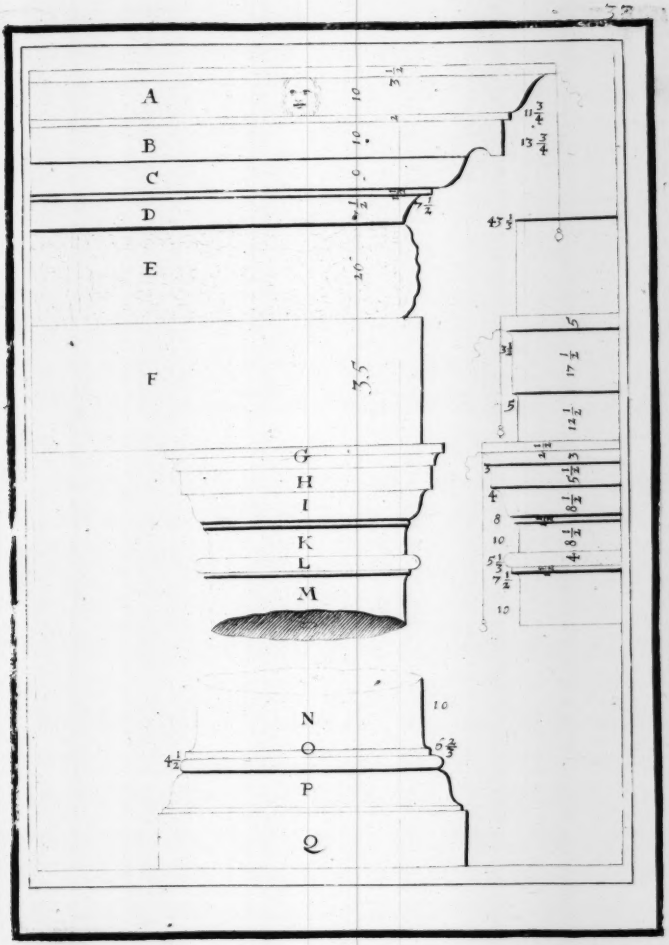


But if they make the Archetraves of ſtone, it muſt be obſerved, which was ſpoken before of the Inter-columnes; There is to be ſeen ſome Ancient Buildings, which may be ſaid to be built according to this Order, becauſe they retain in part the ſame Meaſures, as is the *Arena* of *Verona*, and Theatre of *Pola*, and many others; of which I have undertaken the profiles, not only of the Baſe of the Capitel of the Archetrave of the *Freze* and of the *Cornice*, put down in the laſt page of this Chapter. But alſo thoſe of the Imports of Arches; and of all theſe buildings, I ſhall put the deſignes in my Books of Antiquities.

A. *Scima Recta.*
B. *Corona.*
C. *The projecture of the Corona, and the Scima Recta.*
D. *Cavetto.*
E. *Freze.*
F. *Archetrave.*
G. *Cimatium.*
H. *Abacus,* } *of the Capitel.*
I. *Scima Recta,* }
K. *Hypotrachelium, or Frize of the Capitel.*
L. *Aſtragolus.*
M. *Body of the Column under the Capitel.*
N. *Body of the Column below.*
O. *Annulet, or Cincture.*
P. *Torus, or Scima Reverſa.*
Q. *Orlo, or Plinth of the Baſe.*

Over againſt the *Archetrave* marked *F.* is the profile or deſign of an *Archetrave* very curiouſly wrought.

CHAP.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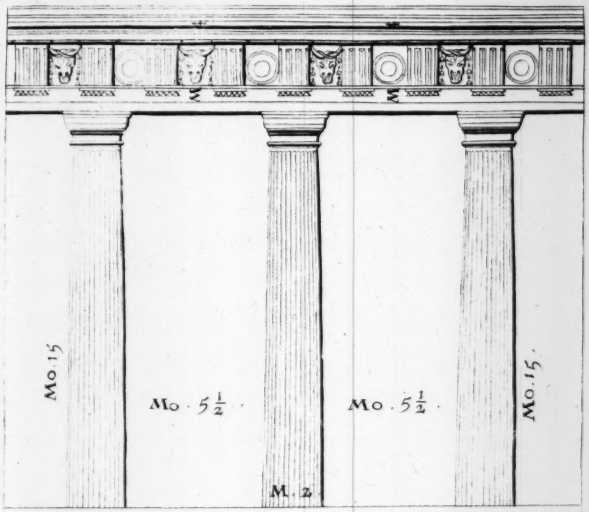
CHAP. XV.

Of the Dorick *Order.*

THe *Dorick* Order had it's Original and Name from the *Dorians*, a Grecian people which dwelt in *Asia*; The Columnes when made alone without Pillasters, ought to be seven and a half, or eight Diametres long; The Inter-columnes are little lesse then three Diametres of the Columnes. And this manner of placing Columnes, by *Vitruvius*, is called *Dyastylos*; but if they joyn to Pillasters, they must be together with the Base and Capitel seventeen Models, and one third in length; And you must observe, that (as I have said before in the 13. Chapter) the Model in this Order only is the half of the Diametre of the Column, divided into thirty parts; And in all the other Orders, it is the whole Diametre, divided into sixty parts.

Amongst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Mo. 15.

M. 2
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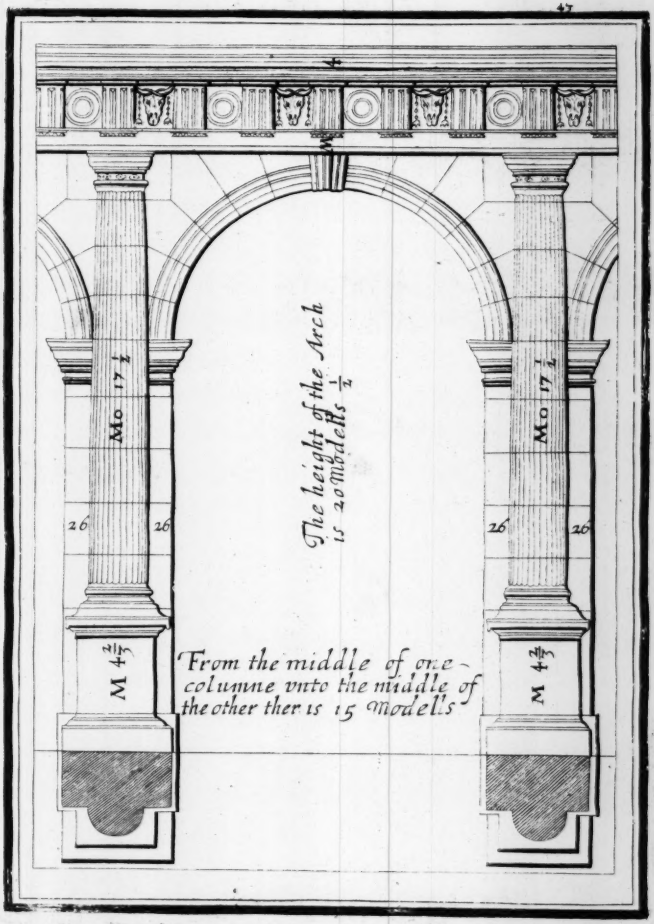
M. 2


The height of the Arch
is 20 Modells ½
From the middle of one
columne vnto the middle of
the other ther is 15 Modell's
Mo 17 ½
Mo 17 ½
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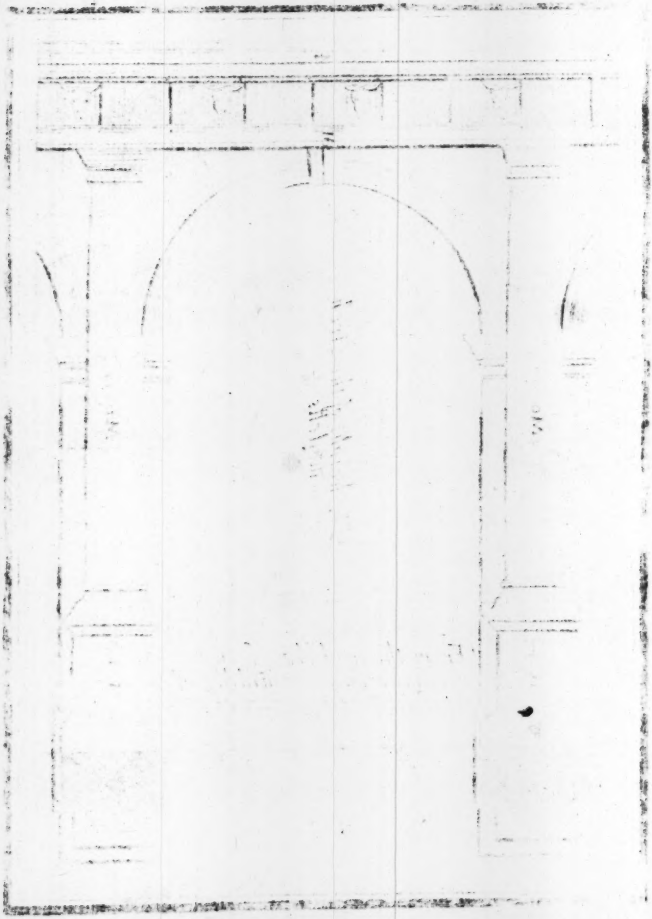
26
M 4⅔
M 4⅔



Amongst Ancient buildings, we see no *Pedestalls* to this Order, yet they are seen amongst the Modern. And if you joyn a *Pedestal* to them, you must make the *Dado* of the *Pedestal* a perfect square; And from it you must take the measures of it's Ornaments: Therefore it must be divided into four equal parts, the Base with i'ts *Zocco* or *Plinth* must be two of them, and the *Cymacium* one, to which must be joyned the *Orlo*, or *Plinth* of the Base of the Column. This kind of *Pedestal* may also be seen in the *Corinthian* Order, as at *Verona*, in the Arch which is called *De Lioni*. I have set down divers Measures of designes, which may be joyned to the *Pedestal* of this Order, which are all very agreeable, and taken from Antiquity, and are very carefully measured. This Order hath no proper Base, wherefore in many Buildings, you may see Columnes without Bases; as in *Rome*, in the Theatre of *Marcellus*, in the Temple *De la Pieta*, near to the said Theatre, in the Theatre of *Vicenza*, and in divers other places. But sometimes the *Attick Base* is joyned to them, which adds very much to their Beauty, and here is the Measure of it.

The height is the half Diametre of the Column, and is divided into three equal parts, one is given to the *Zocco* or *Plinth*; The other two are divided into two parts, of one is made the *Torus* superiour, and the other which remaines is divided into two, and one is given to the *Torus* inferiour, and the other to the *Scocia*, or *Cavetto* with it's *Annulets*. Therefore if you divide it into six parts, of one must be made the *Annulet* above, and of the other that below, and four must remain to the *Scocia*. The projecture must be the sixth part of the Diametre of the Column; The *Ceincture* must be the half of the upper *Torus*: if it be divided from the Base, it's projecture must be the third part of the whole projecture of the Base. But if the Base and part of the Column shall be of one piece, you must make the *Ceincture* small; as you may see in the third design of this Order, where are also two manners of *Imposts* of Arches.

A. *Body of the Column.*

B. *Annulet, or Ceincture.*

C. *The upper Torus.*

D. *Scocia with its Annulets.*

E. *The lower Torus.*

F. *Plinth, or Zocco.*

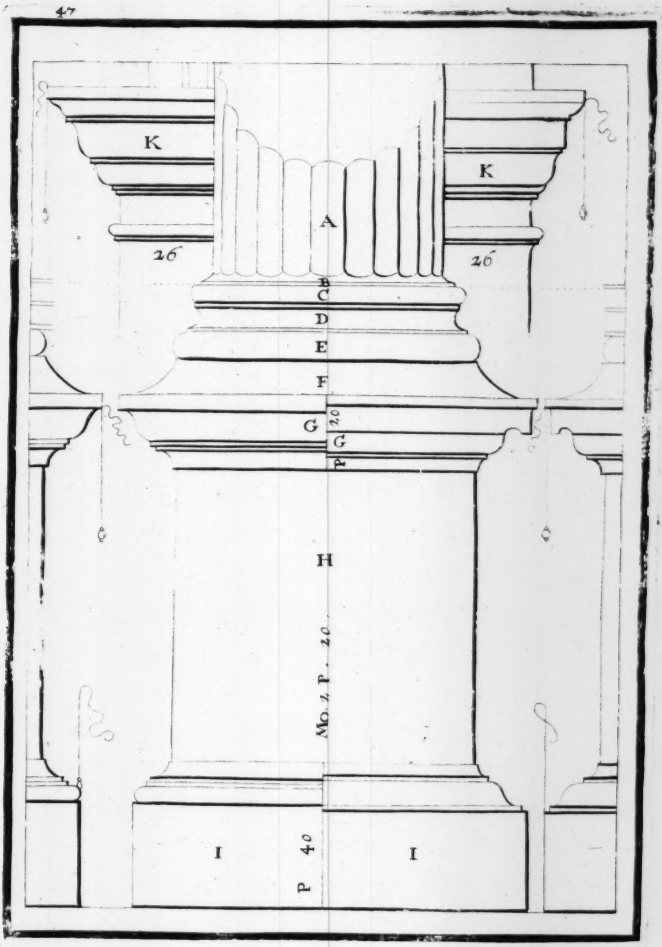
G. *Cimacium.*

H. *Dado, or Square.* } *of the Pedeſtall.*

I. *Baſe.*

K. *Impoſts of Arches.*

The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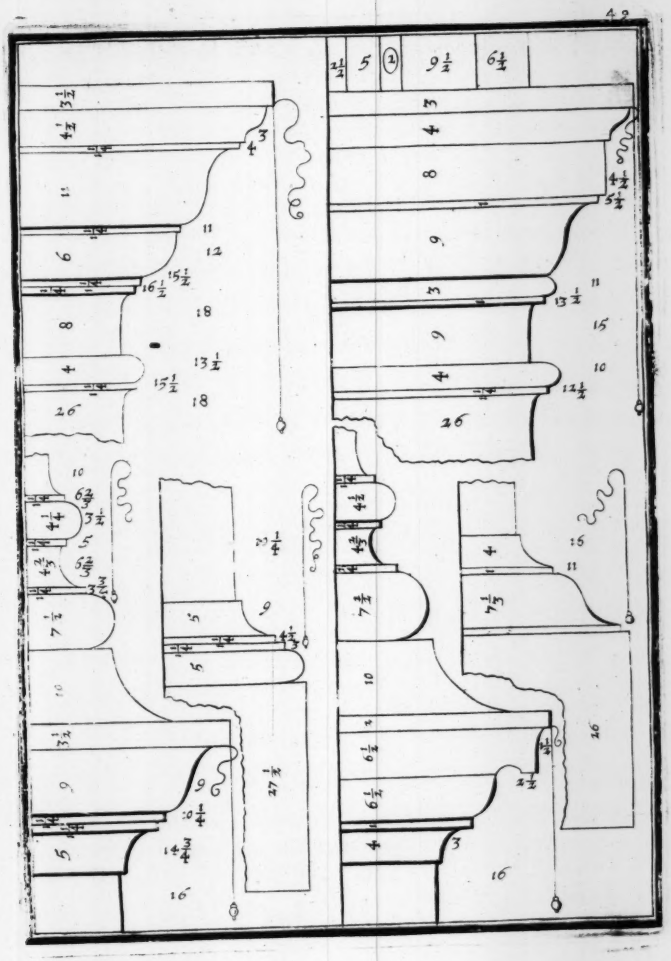
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4½
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2½
16

The height of the Capitel ought to be the half Diametre of the Column below, and is divided into three parts; That above shall be divided into five parts, three shall be for the *Abacus*, and the other two parts for the *Cimatium*, the which must be subdivided into three parts; of one is made the *Listella*, or *Annulet*, and of the other two, the *Scima Recta*. The second part is divided into three equal parts, one is given to the *Annulets* which are three, and are equal, the other two which remaines to the *Ouolo*, or *Echynus*, whose projecture is two thirds of it's height. The third principal part of the said Capitel, is for the *Hypotrachelium*, or *Frize* of the Capitel, given to the *Collarino*; The whole projecture is the fifth part of the Diametre of the Column. The *Astragal* is as high as all the three *Annulets*, and is in projecture equal to the body of the Column below. The *Annulet* or *Ceincture*, is half the height of the *Astragal*, the projecture thereof is plum with the Centre of the said *Astragal*.

Upon the Capitel is made the *Architrave*, which is to be in height half the thickneſſe of the Column, that is to say, one Model; It is divided into seven parts, of one is made the *Tenia*, whose projecture must be equal to it's height. The whole is divided into six parts, one whereof is given to the *Guttæ*, the which ought to be six in number, and to the *Listella* which is under the *Tenea*, which is a third of the said *Guttæ*. The rest is divided into seven parts, from the *Tenia* downwards, three whereof is given to the first *Fascia*, and four to the second. The *Frize* is in height a Model and half, the breadth of the *Trigliph*, is one Model, and its Capitel is the sixth part of a Model. The *Trigliph* is divided into six parts, two whereof is given to the two chanels in the middle, and one to the two half chanels at the extremities, and the other three make the spaces that are below the said chanels. The *Metopa*, that is to say, the space between two *Trigliphs* ought to be so broad as high.

The *Corince* ought to be in height one Model, and a sixth part, and is divided into five parts and a half; two whereof is given to the *Cavetto* and *Ouolo*; The *Cavetto* is lesse then the

the *Ouolo*, as much as is the *Liſtella*; The other three and half is given to the *Coronna*, and for the *Scima Reverſa*, and *Scima Recta*.

The *Coronna* ought to have in projecture four ſix parts of the Model, and on it's plain which looketh downwards, and projecteth forth, muſt have in length ſix *Guttæ*, and three in breadth over the *Trigliphs* with their liſts, and over the *Metopa* certain Roſes.

The *Guttæ*, or bells, anſwer to thoſe which are under the *Tenea*, which are made in form like a Bell.

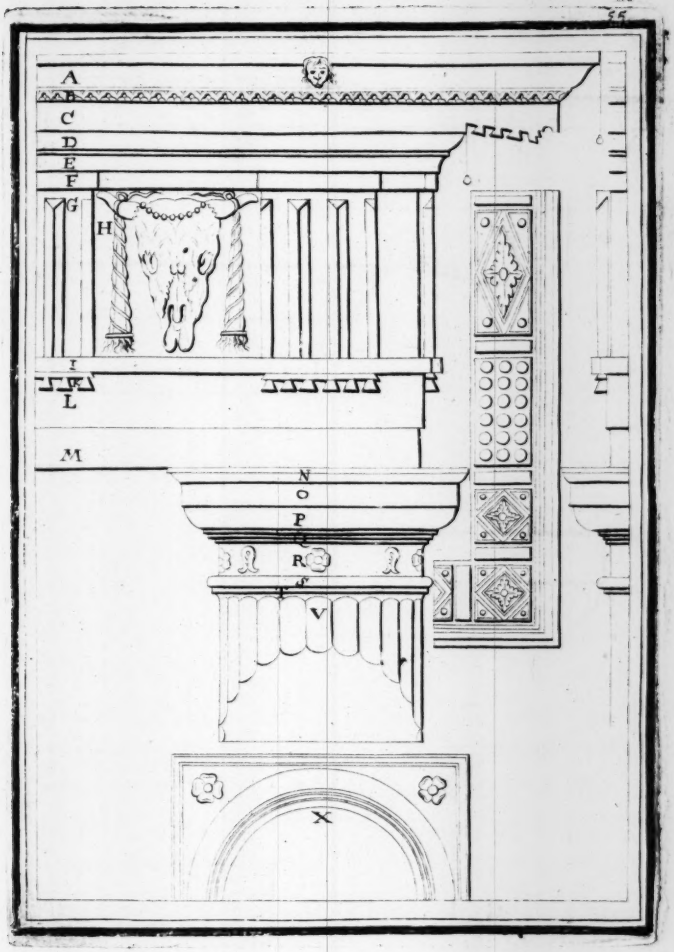
The *Cimatium* muſt be an eight part thicker then the *Corona*, and is divided into eight parts: two whereof is given to the *Orlo* or *Liſtella*, and ſix remaines to the *Cimatium*, whoſe projecture is ſeven parts and a half. Whereupon the *Architrave*, the *Frize*, and the *Cornice*, fall out to be in height the fourth part of the length of the Column; and theſe are the meaſures of the *Cornice*, according to *Vitruvius*, from whom I have a little ſwerved, altering the members, and making them a little bigger.

A. *Scima Recta.*
B. *Scima Reverſa.*
C. *Coronna.*
D. *Ouolo.*
E. *Cavetto.*
F. *The Capitels of the Trigliph.*
G. *Trigliph.*
H. *Metopa.*
I. *Tenia.*
K. *Guttæ.*
L. *Prima Faſcia.*
M. *Secunda Faſcia.*

Parts of the Capitel.

N. *Cimatium.*
O. *Abacus.*
P. *Ouolo,* or *Echinus.*
Q. *Annulets.*
R. *Hypotrachelium,* or *Frize.*
S. *Aſtragal.*
T. *Liſtella,* or *Ceincture.*
V. *Body of the Column.*
X. *The Plain of the Capitel, and the model divided into thirty parts.*
Y. *The under part of the Coronna.*

CHAP. XVI.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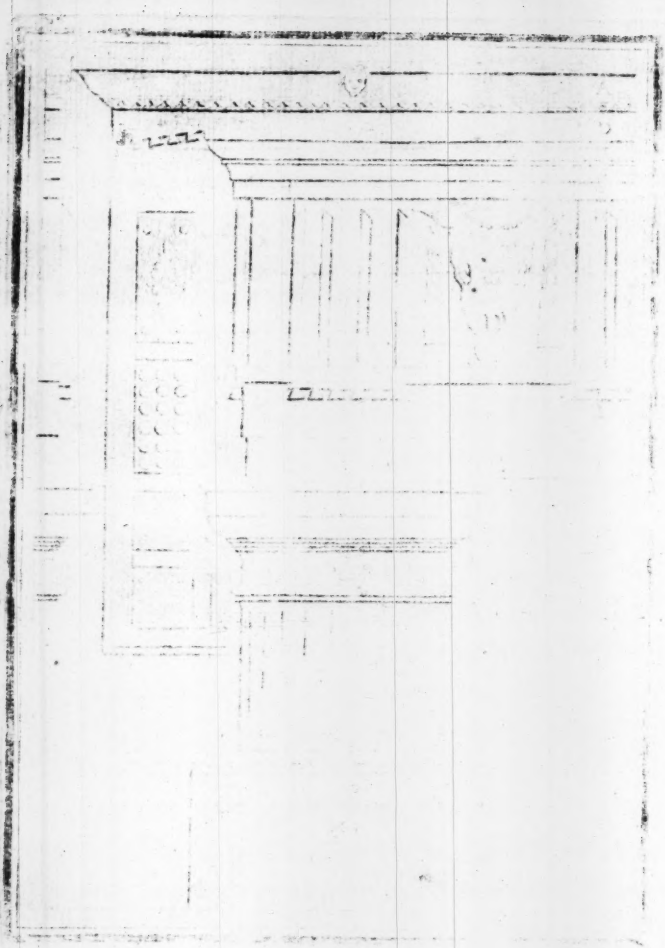
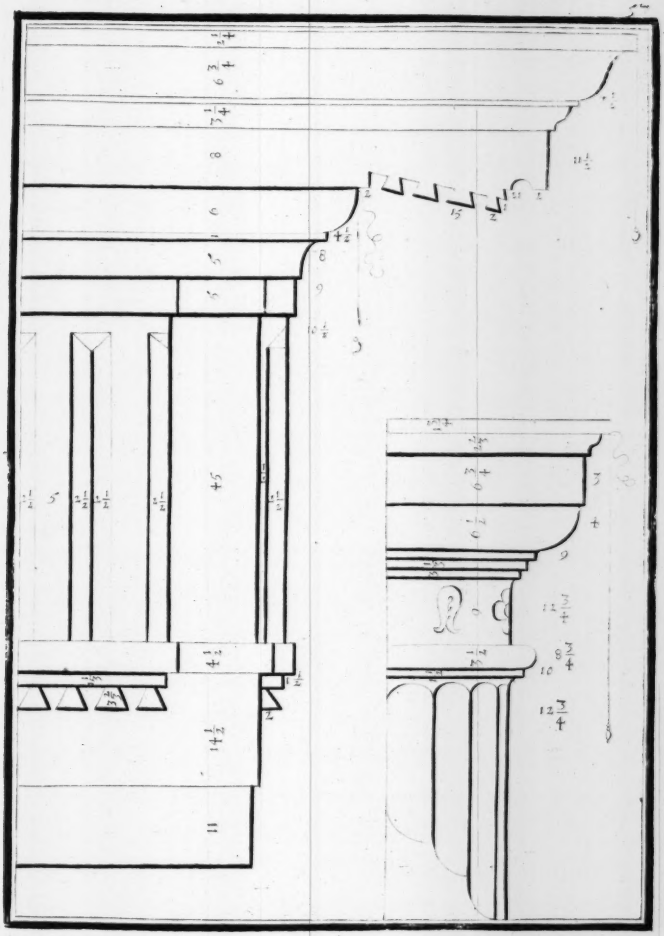
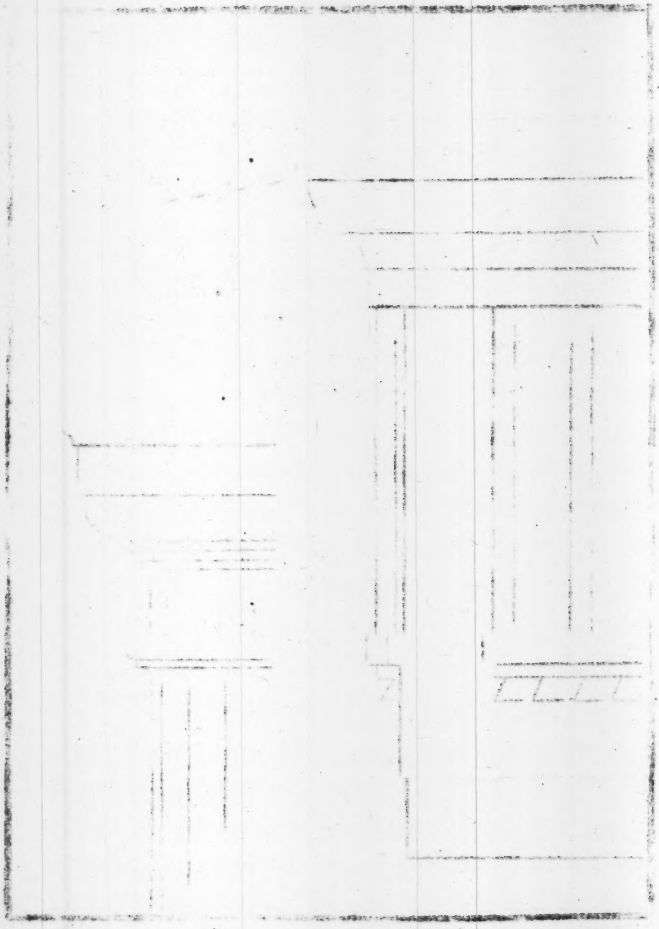


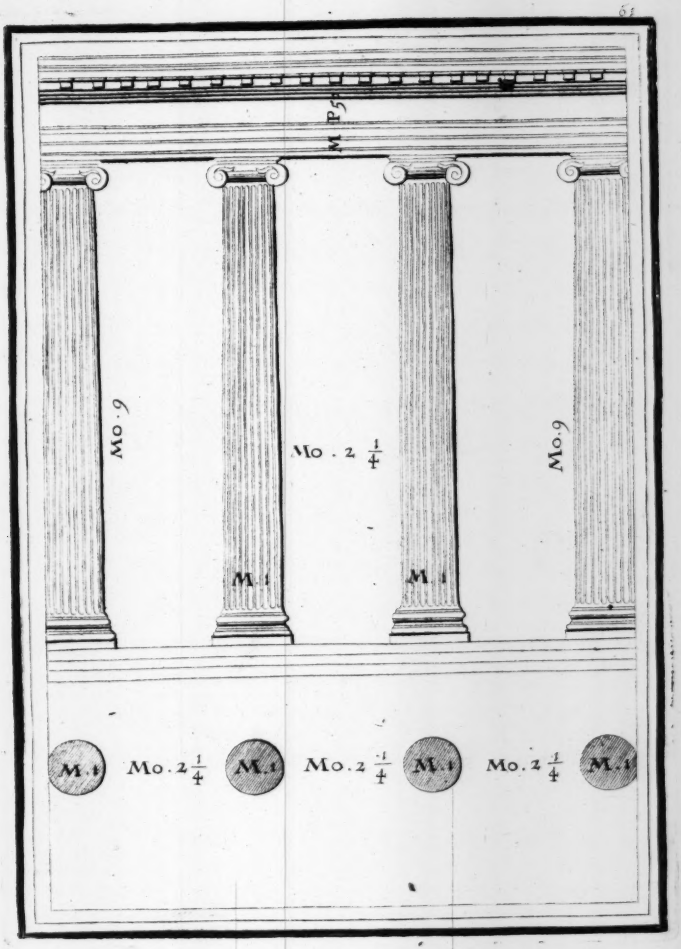




CHAP. XVI.

Of the Ionick *Order.*

THe *Ionick* Order had its Original in *Ionia*, a Province in *Asia*; and we read, that the Temple of *Diana* at *Ephesus* was built of this order: The Columnes, with Capitel and Base, are nine models long, and by a model is understood the Diametre of the Column below. The *Architrave Frize*, and *Cornice*, are the fifth part of the height of the Column; In the following design, which is of Columnes alone, the Inter-columnes are of two Diametres, and a fourth part. And this is the faireſt and moſt commodious manner of Inter-columnes, and by *Vitruvius* is called *Euſtillos*. In the other design, which is of Arches. The *Pillaſters* are in breadth a third part of the height of the Arch; and the Arches are in height two ſquares.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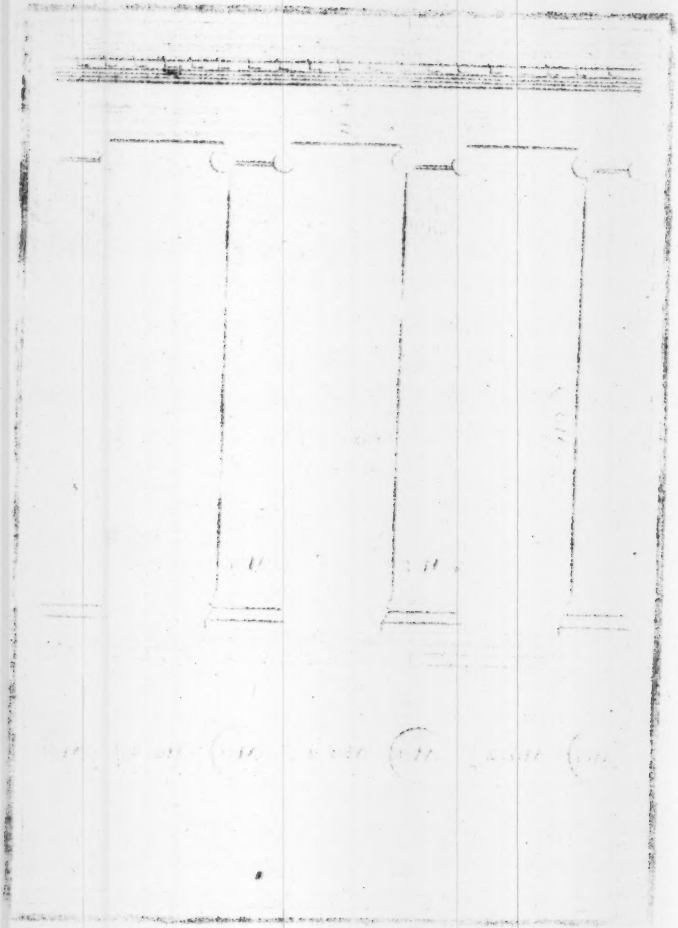
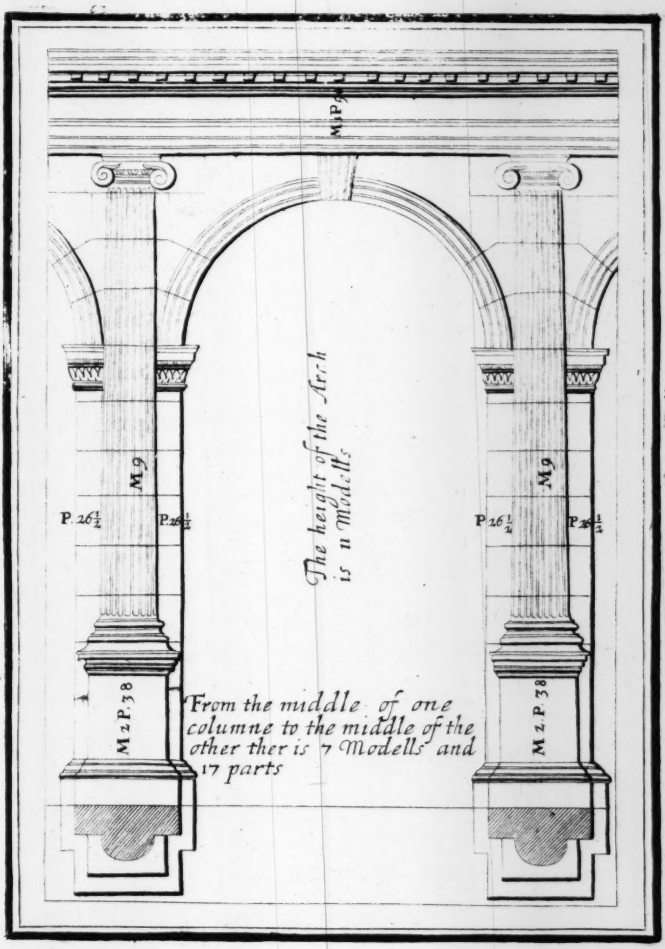
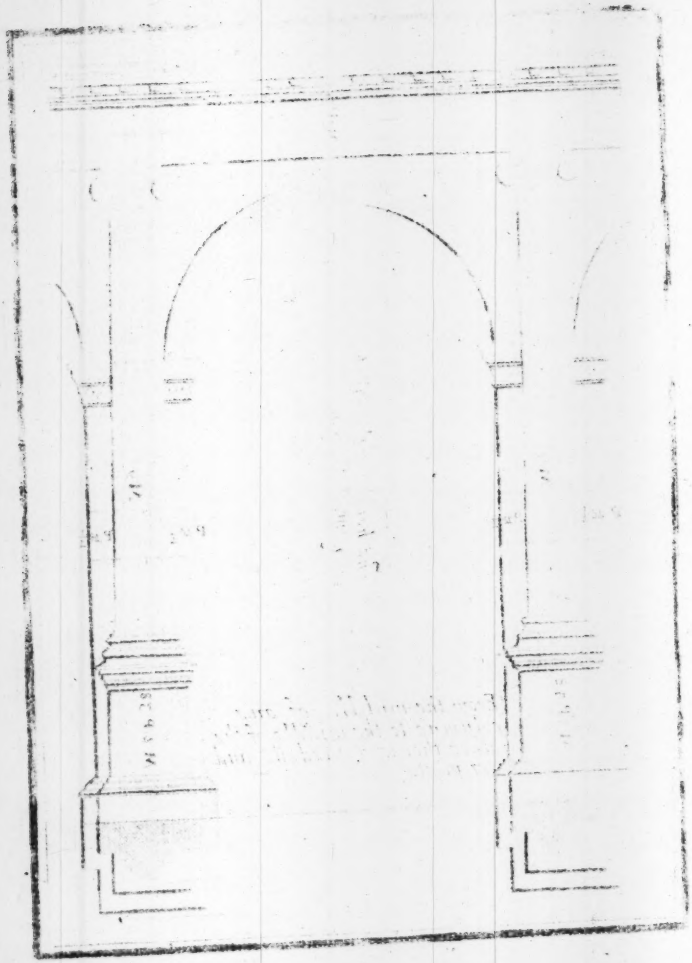



M.P.9
M.9
P.26½
P.26½
The height of the Arch
is 11 Modells
M.9
P.26½
P.26½
From the middle of one
columne to the middle of the
other ther is 7 Modells and
17 parts
M.2.P.38
M.2.P.38



If you put a *Pedeſtal* to the Columnes of the *Ionick* Order, as in the deſign of the Arches, it muſt be made as high as half the breadth of the light of the Arch, and muſt be divided into ſeven parts and half, of two of them ſhall be made the Baſe of one; the *Cimatium*, and four and half, which remaines, ſhall be for the *Dado*, or ſquare of the *Pedeſtal*.

The Baſe of this Order is in thickneſſe half a model, and is divided into three parts; one is for the *Plinth*, it's projecture is the fourth part of the ſaid thickneſſe, and conſequently the eight part of a model. The other two parts of the Baſe are divided into ſeven, of three is made the upper *Torus*; The other four are divided again into two parts, one is given to the *Scotia* above, and the other to that below, which ought to have more projecture then the other.

The *Aſtragals* ought to have the eight part of the *Scotia*; The *Ceincture* of the Column is the third part of the *Torus* of the Baſe; But if it be ſo that you make the Baſe joyn with part of the Column, you muſt make the *Ceincture* ſmall, as I have alſo ſaid in the *Dorick* Order, the *Ceincture* hath in projecture half the projecture aforeſaid; Theſe be the meaſures of the *Ionick* Baſe, according to *Vitruvius*.

But becauſe in many antique buildings are ſeen to this Order *Attick* Baſes, and to me ſeemes more agreeable, upon the *Pedeſtal*; I have deſigned the *Attick* Baſe with a ſmall *Torus* or *Aſtragal*, under the *Ceincture*; not omitting therefore to make the deſign thereof as *Vitruvius* teacheth us.

The deſignes *L.* are two different profiles for to make the Impoſts of Arches; and of each there is ſet down the Meaſures by Numbers, which ſhew the parts of a model, as is done in all the other deſignes; Theſe *Impoſts* are in hight half as much again as the thickneſſe of the *Pillaſter* which ſupports the Arch.

A. *Body of the Column.*

B. *The Astragal with the Ceincture, which are members of the Column.*

C. *Vpper Torus.*

D. *The hollow called Scotia.*

E. *The lower Torus.*

F. *The Plinth fastned to the Cymatium of the Pedestal.*

G. *Cymatium in two formes* } *of the Pedestal.*

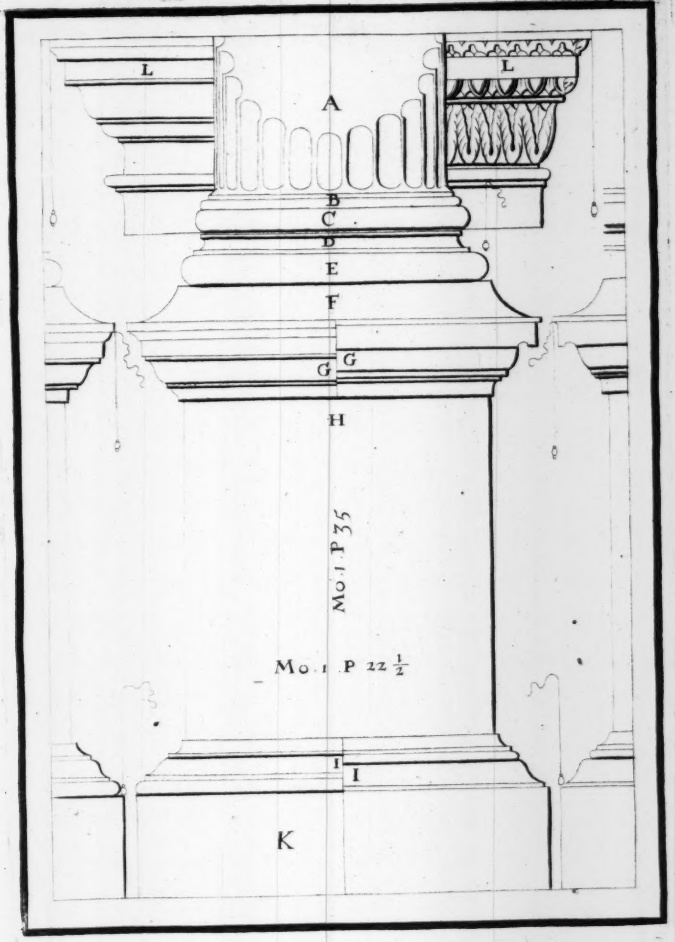
H. *Dado, or plain square.*

I. *Base in two formes.*

K. *Orlo, or Plinth.*

L. *Imposts for the Arches.*

To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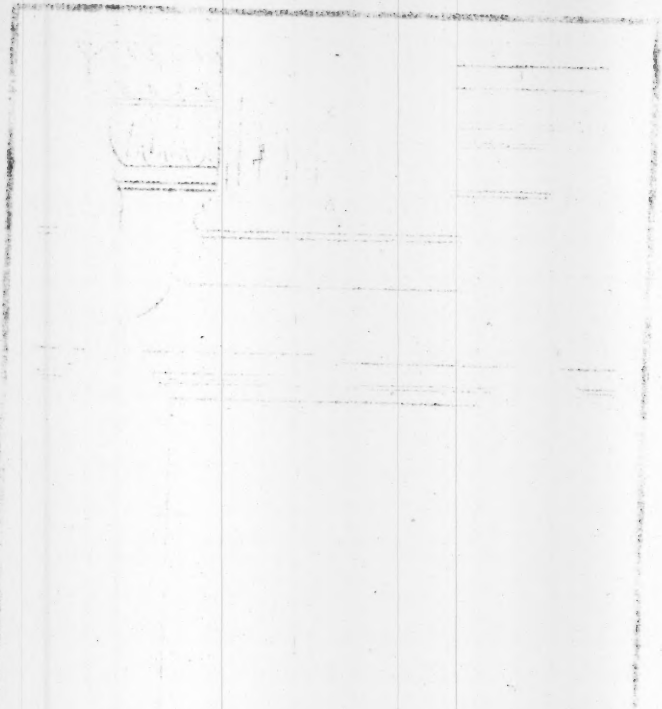

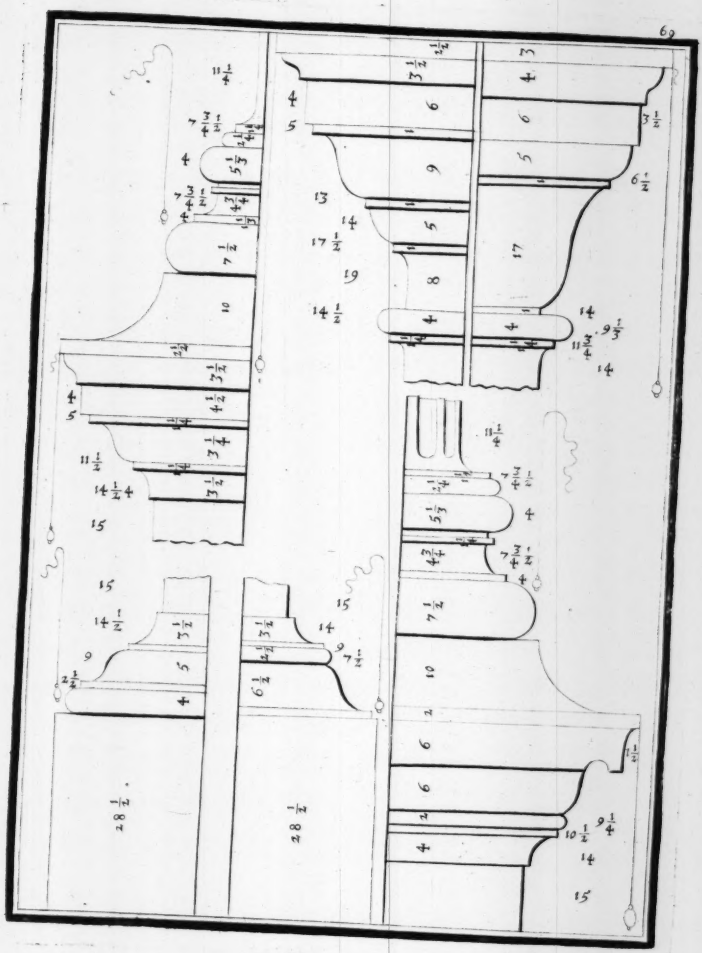
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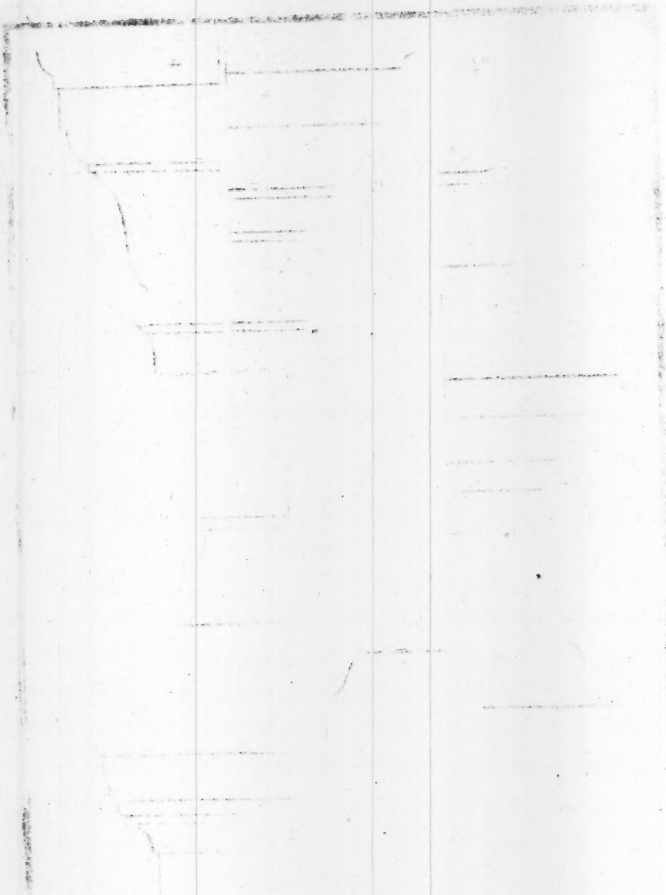
28 1/2



To make the *Capitel*, the foot of the Column must be divided into eighteen parts, and nineteen of such parts is the breadth and length of the *Abacus*, and the half is the height of the *Capitel* with the *Voluta*; whereupon it becomes to be nine parts and a half high: one and half is for the *Abacus* with its *Cimatium*, the other eight remaines to the *Voluta*, which is made in this manner. From the extremity of the *Cimatium*, with n, is placed one of the nineteen parts, and from the point which is there made, is let fall a line plumb, which divides the *Voluta* in the middle, and is called *Catheta*; And where the point falls in this line which separates the four parts and half above, and the three and half below, there is made the Centre of the eye of the *Voluta*; whose Diametre is one of the eight parts; and from the said point is drawn a line which intercects at right Angles. The *Catheta* divides the *Voluta* into four parts, in the eye of which is formed a square, the bigness whereof is the half Diametre of the said eye. The *Diagonal* lines being drawn in it, in them are made the points where the fixed foot of the *Compass* is to stand to make the *Voluta*, and they are (computing the Centre of the eye) thirteen Centres; as to the Order which must be observed in them, it appeares by the number placed in the Design. The *Astragal* of the Column is right against the eye of the *Voluta*; The *Volutes* are as thick in the middle as is the *projecture* of the *Ouolo* or *Echinus*, which reacheth beyond the *Abacus*, so much as is the eye of the *Voluta*; the hollow of the *Voluta* is even with the body of the Column. The *Astragal* of the Column turnes about under the *Voluta*, and is alwayes seen: as appears in the plat-form of the Column; And 'tis natural, that so slender a thing as is the *Voluta* should give way to one so hard as is the *Astragal*; and the *Voluta* is alwayes equally distant from it.

They were wont to make in the Angles of Rowes, of Columnes, or porches of the *Ionick* Order, *Capitels* which had the *Voluta* not only in the front, but also in that part that making the *Capitel*, as they were wont to do, would be the flank; Whereupon they come to have the front on two sides, and are called *Angular Capitels*; and how they made them, I shall demonstrate in my Book of Temples.

A. *Abacus*.

A. *Abacus.*

B. *Hollowes of the Voluta.*

C. *Ouolo, or Echinus.*

D. *Aſtragal under the Echinus.*

E. *Ceinčture, or Annulet.*

F. *Body of the Column.*

G. *Line called Catheta.*

On the Plat-form of the Capitel of the Column, the ſaid Members are marked with the ſame Letters.

S. *The eye of the Voluta in a large form.*

Members of the Baſe, according to Vitruvius.

K. *Body of the Columns*

L. *Ceinčture, or Annulet.*

M. *Torus.*

N. *Scotia prima.*

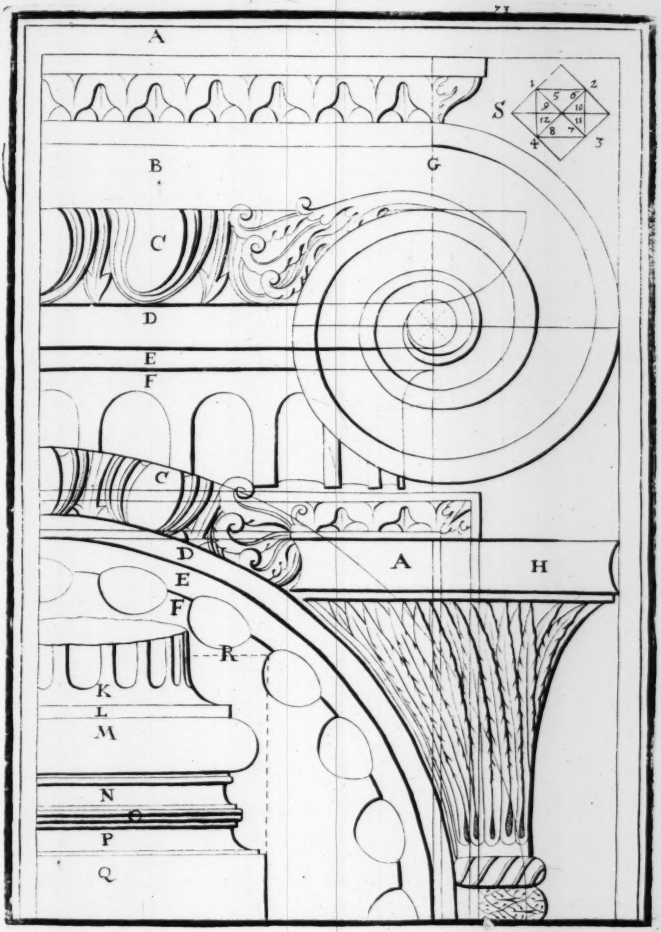
O. *Tondino, or Aſtragal.*

P. *Scotia ſecunda.*

Q. *Orlo, or Plinth.*

R. *Proječture.*

The


A
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The *Architrave*, *Frize*, and *Cornice*, make (as I have said) the fifth part of the height of the Column, and the whole is divided into twelve parts; The *Architrave* four, the *Frize* three, and the *Cornice* five: the *Architrave* is divided into five parts, of one is made the *Cimatium*, and the rest are divided into twelve, three are given to the first *Fascia*, and its *Astragal*, four to the second and its *Astragal*, and five to the third.

The *Cornice* is divided into seven parts, $\frac{1}{4}$. two are given to the *Scotia*; and *Ouolo*, two the *Modilions*, and the $\frac{1}{4}$. to the *Coronna*, and *Scima Recta*, and projecteth forwards as much as its thickness.

I have designed the Front, the Flank, and the Plat-form of the *Capitel*, the *Architrave*, *Frize*, and *Cornice*, with their convenient Sculptures.

A *Scima Recta.*

B. *Scima Reverſa.*

C. *Coronna.*

D. *Cimatium of the Modilions.*

E. *Modilions.*

F. *Ouolo.*

G. *Cavetto.*

H. *Frize.*

I. *Cimatium of the Architrave.*

K. L. M. *Are the firſt, ſecond, and third Faſcia.*

Members of the Capitel.

N. *Abacus.*

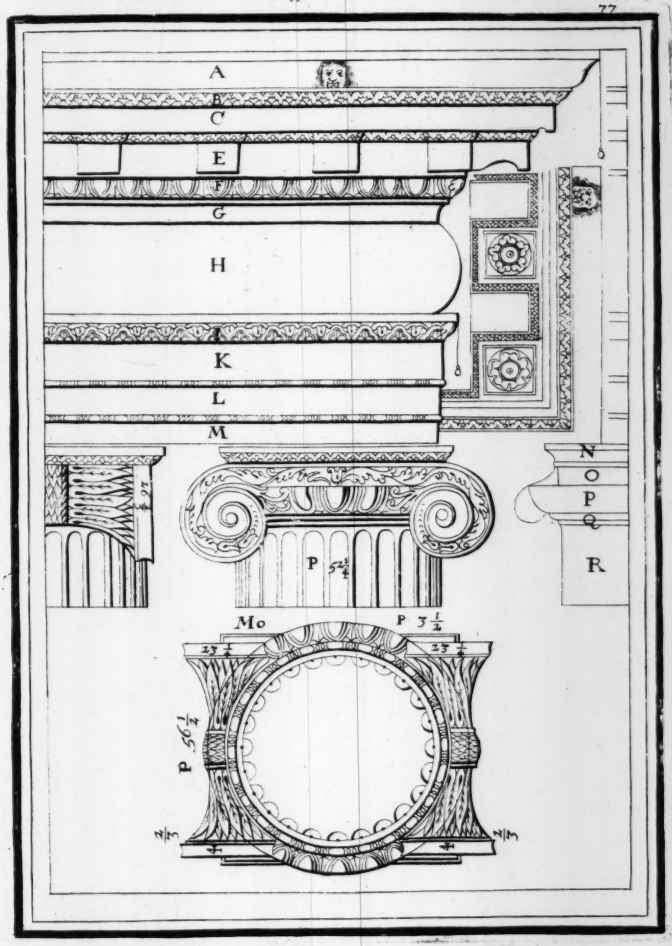
O. *Hollow of the Voluta.*

P. *Ouolo, or Echinus.*

Q. *Aſtragal of the Column.*

R. *Body of the Column.*

CHAP.


A
B
C
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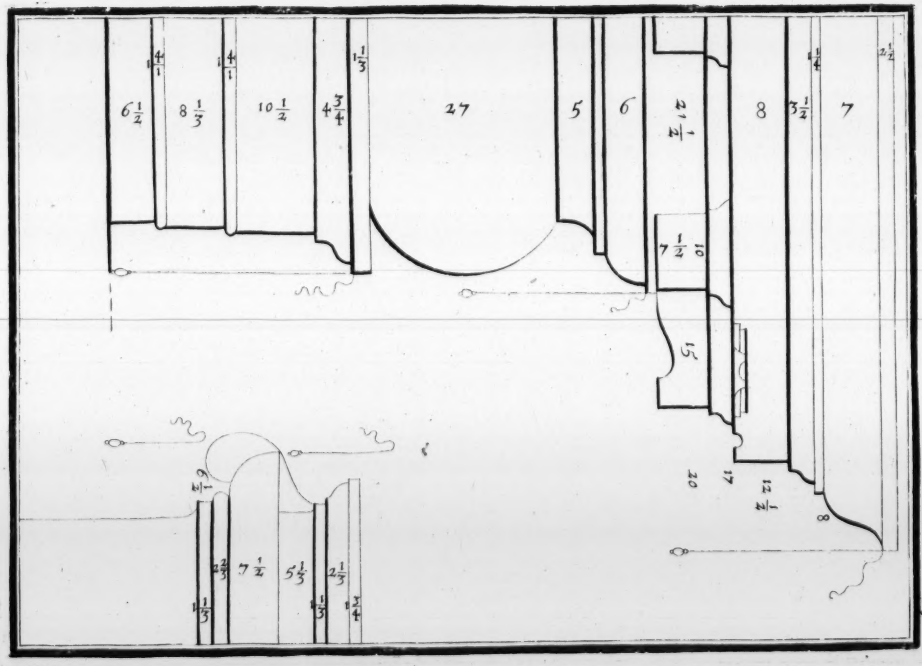
F
G
H
K
L
M
N
O
P
Q
R
P 5 1/4
Mo
P 3 1/2
23 1/4
23 1/4
P 56 1/2
4 1/2
4 1/2

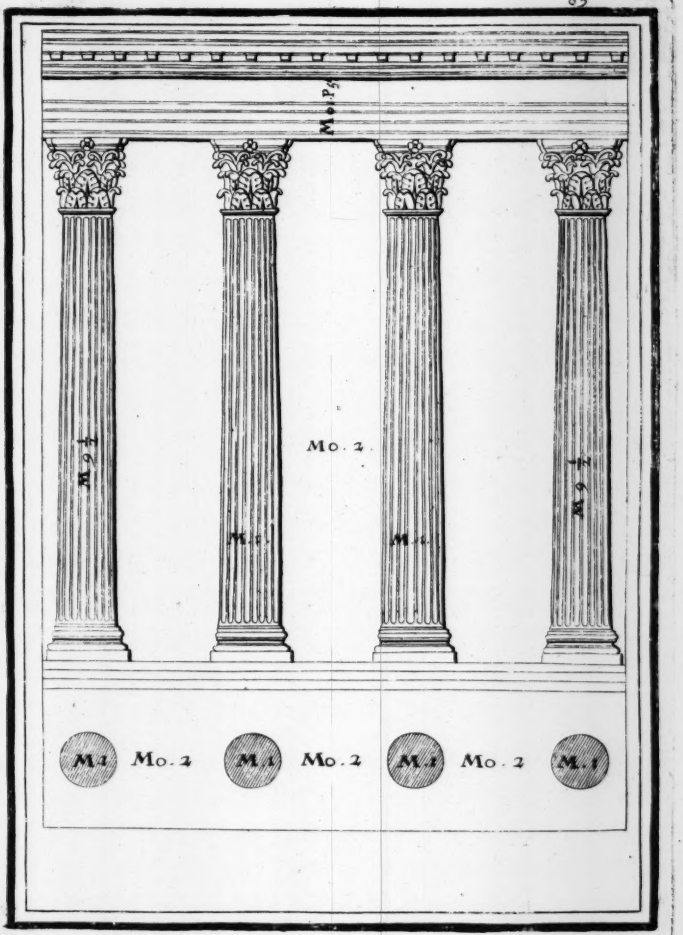

6 1/2
8 1/3
10 1/2
4 3/4
27
5
6
21 1/2
8
3 1/2
7
7 1/2
10
15
20
17
12 1/2
8
5 1/3
7 1/2
2 1/3
2 1/3
79

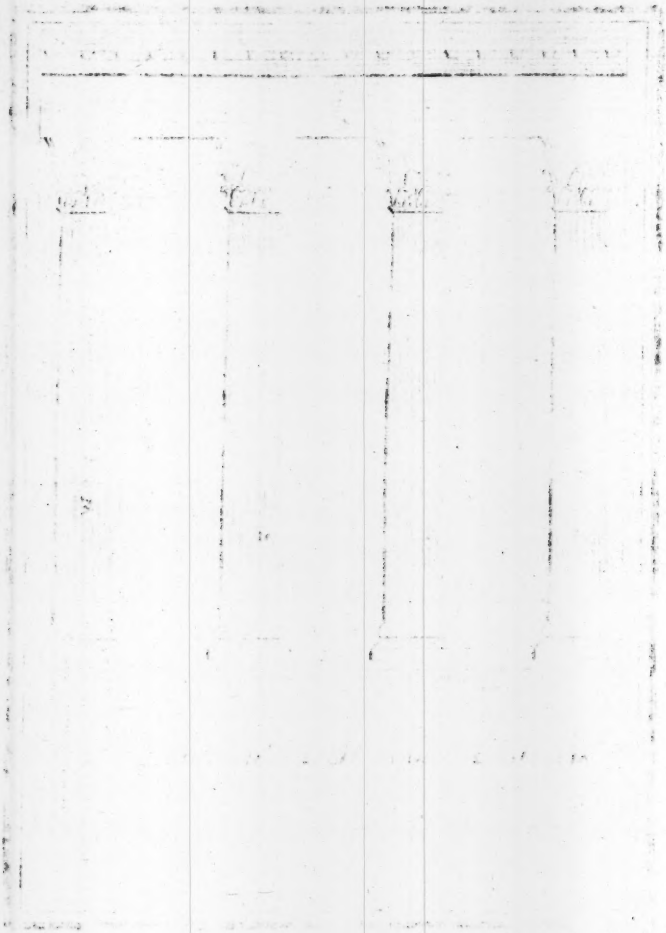
CHAP. XVII.

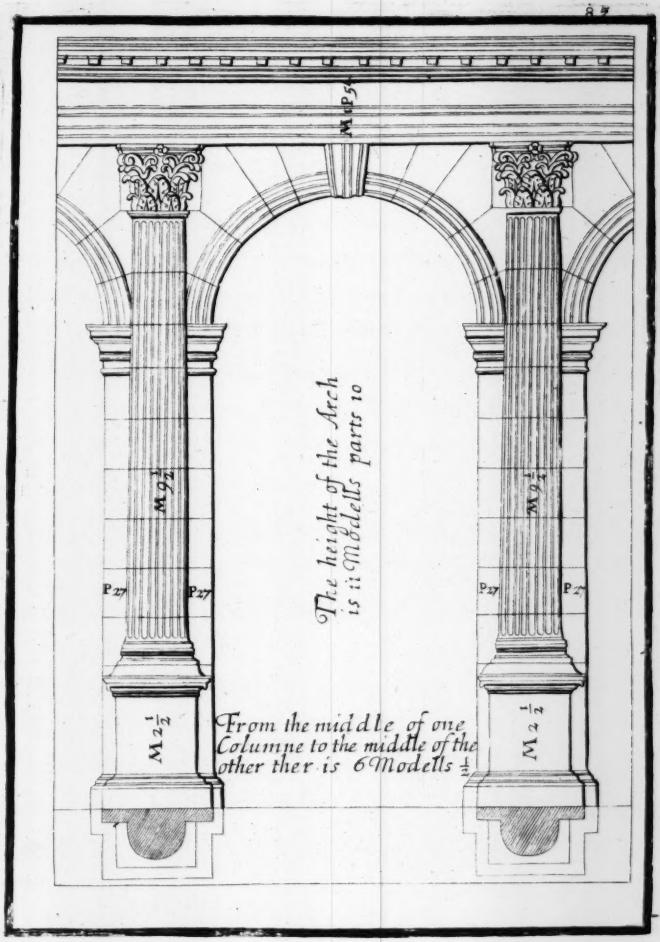
Of the Corinthian *Order.*

AT *Corinth* a noble City of *Peloponese*, or *Morée*, first of all was found the Order which is called *Corinthian*, which is more adorned and beautified then any I have yet treated on.

The Columnes are like the *Ionick*, and with the *Base* and *Capitel* joyned to them, they are nine models and a half long. If you make them fluted, they must have 24 flutes or channels, which must be made half so deep as broad: the plaines or spaces between one flute and the other must be a third part of the breadth of the said flutes: The *Architrave Frize* and *Cornice*, are a fifth part of the height of the Column; In the design of Columnes alone, the Inter-columnes are two Diametres, as is the Portal of St. *Maria Rotunda* in *Rome*; and this form of Rowes of Pillars, is by *Vitruvius* called *Systylos*. And in that of Arches, the *Pillasters* are of two parts of five of the light of the Arch; And the light of the Arch is in height two squares and half, the thickneſſe of the Arch being comprehended.


M. 1
M. 2
M. 1
M. 2
M. 1
M. 2
M. 1
M. 2
M. 1
M. 1
M. 1
M. 1




M 1 P 5
M 9 1/2
M 9 1/2
P 27
P 27
P 27
P 27
The height of the Arch
is 11 Modells parts 10
From the middle of one
Columne to the middle of the
other ther is 6 Modells 1/2
M 2 1/2
M 2 1/2

The *Pedestal* under the *Corinthian* Column must be in height a fourth part of the length of the Column, and being divided into eight parts, one is given to the *Cimatium*, two to its *Base*, and four remains to the *Dado*, or plane of the *Pedestal*; The *Base* must be divided into three parts, two for the *Zocco* or *Plinth*, and one to the *Cornice*.

The *Base* of the Column is the *Attick*, but in this Order it differs from that which is put to the *Dorick* Order: in this the *Projecture* is the fifth part of the Diametre of the Column, whereas in the *Dorick* it is the sixth part; It may also vary in some other parts, as may be seen in the design, where also is set down the *Imposts* of the Arches, the which is in height one half more then the thickness of the *Membretto*, that is to say, the *Pillaster* which beares up the Arch.

A. *Body*

A. *Body of the Column.*

B. *Ceincture and Aſtragal of the Column.*

C. *The upper Torus.*

D. *Scotia with the Aſtragals.*

E. *The lower Torus.*

F. *Orlo, or Plinth of the Baſe faſtned to the Cimatium of the Pedeſtal.*

G. *Cimatium.*

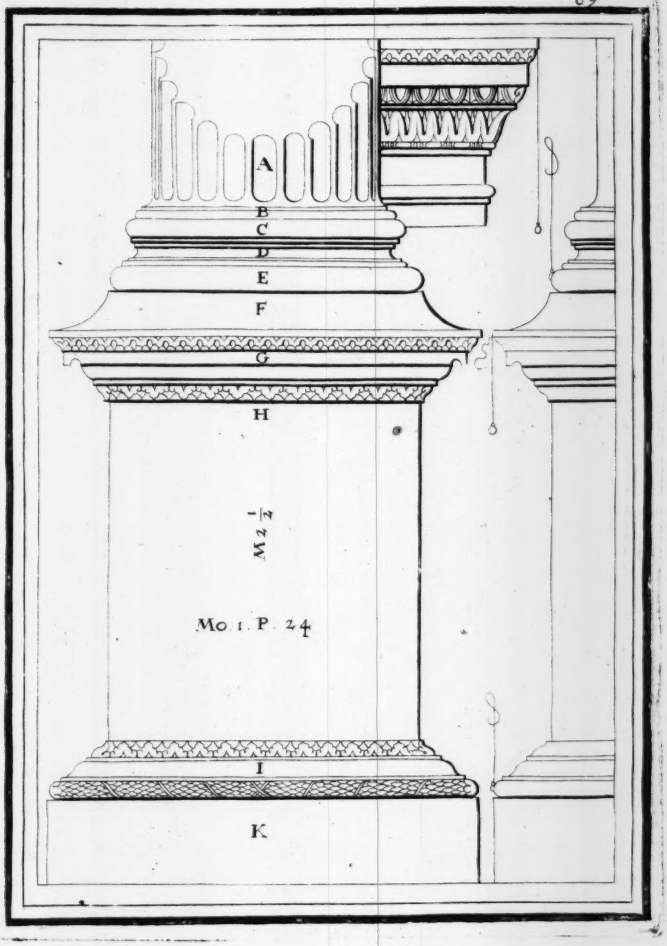
H. *Dado or plain.* } *of the Pedeſtal.*

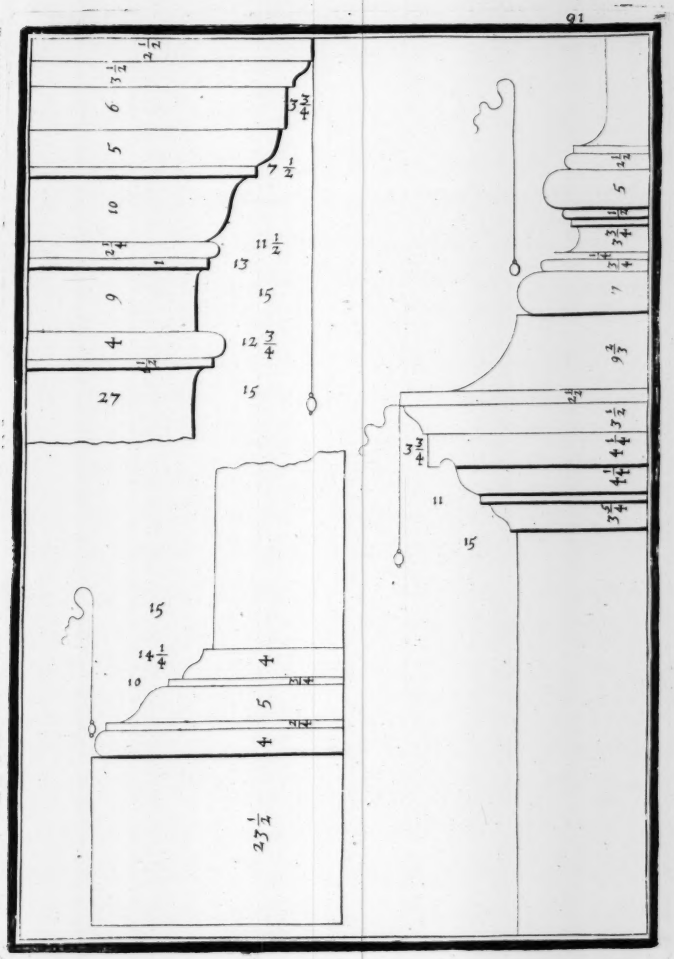
I. *Coronna of the Baſe.*

K. *Orlo, or Plinth of the Baſe.*

The Impoſt of the Arch is at the ſide of the Column.

The


A
B
C
D
E
F
G
H
M 2 1/2
Mo. 1. P. 24
I
K


2 1/2
3 1/2
6
3 3/4
5
7 1/2
10
2 1/4
1
11 1/2
13
9
15
4
12 3/4
1 1/2
27
15
15
14 1/4
4
10
5
4
23 1/2
5
2 1/2
1 1/2
3 3/4
7
9 3/4
2 1/2
3 1/2
3 3/4
4 1/4
4 1/4
11
3 3/4
15

The *Corinthian Capitel* ought to be as high as the thickneſſe of the Column below, and a ſixth part more which is allowed to the *Abacus*; The reſt is divided into three equal parts, the firſt is given to the firſt leaf, the ſecond to the ſecond; and the third is divided again into two, and of that part next the *Abacus* is made the *Caulicoli* with the leaves, which ſeem to ſupport them whence they grow; And therefore the ſtalk from whence they grow muſt be made thick, and in their foldings muſt diminiſh by little and little: The example hereof is taken from plants, which are bigger at the root then at the extremity of the branches. The Bell which is the body of the *Capitel* under the leaves, ought to be direct to the bottoms of the flutes of the Column.

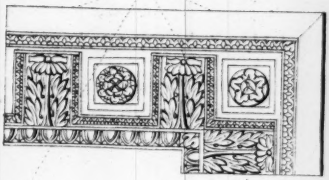
To make the *Abacus*, that it may have a convenient *Projecture*, make the ſquare A B C D. each ſide whereof muſt be a *Model* and half, and the *Diagonal Lines* muſt be drawn in it from one Angle to the other, and where they interceſt each other in the point E. which is the middle and centre of the ſaid ſquare; The fixed foot of the *Compas* muſt be placed, and towards each Angle of the ſquare muſt be marked a *Model*; and where the points F G H I. are, the lines muſt be drawn, which interceſts at right Angles with the ſaid *Diagonals*, and that they may touch the ſides of the ſquare in L M N O. Theſe ſhall be the bounds of the *Projecture*, and how much the length is, ſo much ſhall be the breadth of the hornes of the *Abacus*.

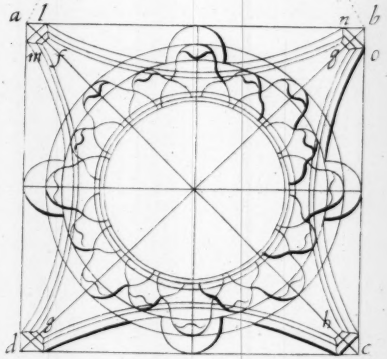
The *Curvature*, or hollowing of the *Abacus*, is made by laying a long a thread from one horn to the other which is from the point L. to the point N. then from the ſaid points, draw two Arches of Circles, then ſet in one foot of the *Compas* in the interſection at the point P. with the other deſcribe the Arch, which will make the hollowing or curvature of the *Aſtragal* of the Column, and is ſo made that the tongues of the leaves toucheth it, or rather advanceth a little beyond, and this is their *Projecture*. The Roſe ought to be as large as the fourth part of the Diametre of the Column at the foot: The *Archetrave*, *Frize* and *Cornice*, (as I have ſaid) are to be a fifth part of the height of the Column, and the whole is to be divided into twelve parts, as in the *Ionick*; But here is the difference; in this the *Cornice* is divided into eight

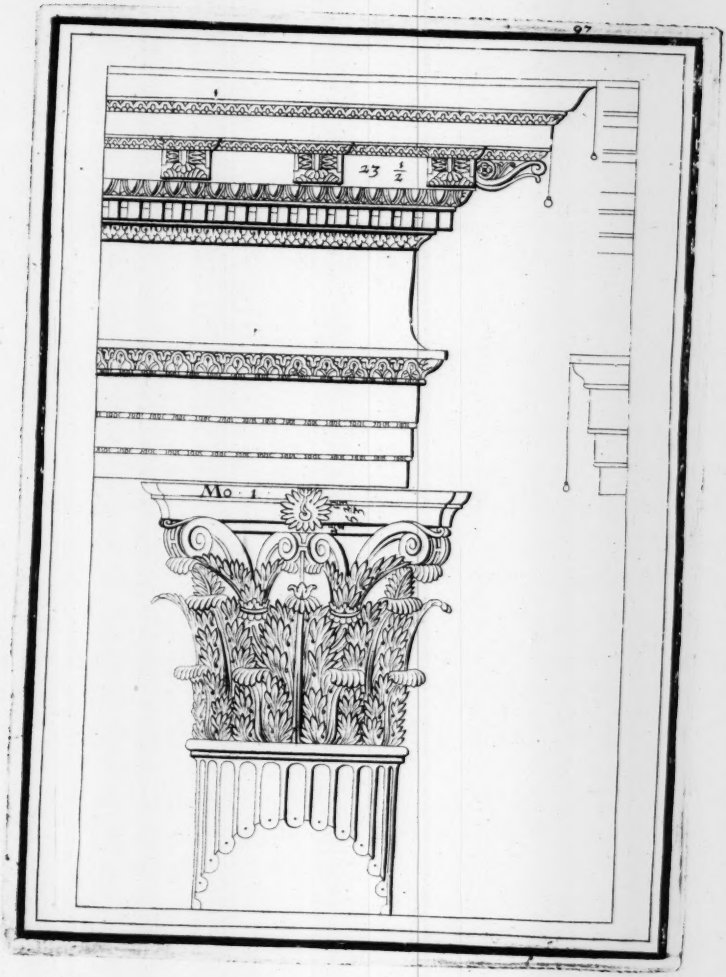
parts and half, of one is made the Intabliment, of the other the *Denticuli*, of the third the *Ouolo*, of the fourth and fifth the *Modilions*, and of the other three and half the *Coronna*, and the *Scima*. The *Cornice* hath as much *Projecture* as it is high, the Coffers or places of the Roſes that go between the *Modilions* muſt be ſquare, and the *Modilions* as big as half the plain of the ſaid Roſes. The members of this Order have not been marked with Letters as the foregoing, becauſe by them theſe may eaſily be underſtood.

CHAP.

P






23 1/2
Mo 1

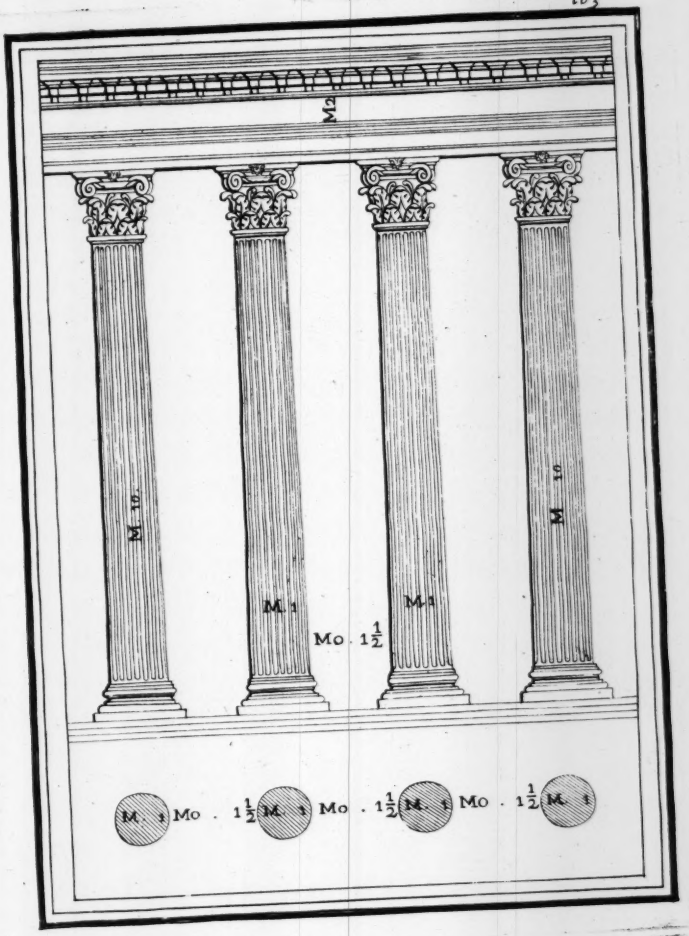
6 1/3
3
7 1/3
7 1/4
11 1/4
21 1/4
7 1/2
4 1/2
5 1/2
4 1/2
8 1/4
28 1/2
5
5 1/4
10 1/2
6 1/2
8 1/4
7 1/2
6 1/4
8 1/2
3
5 2/3
3 1/4
4

CHAP. XVIII.

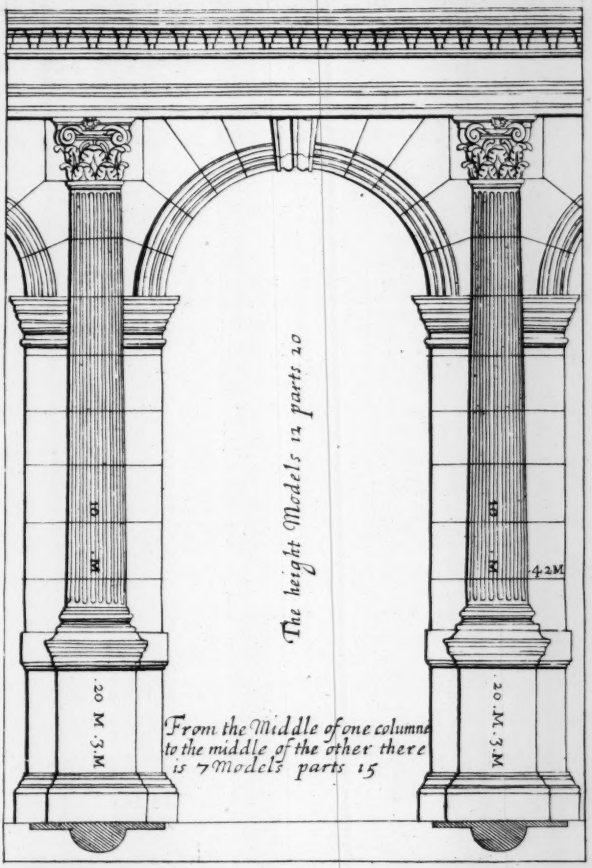
Of the Compoſita *Order.*

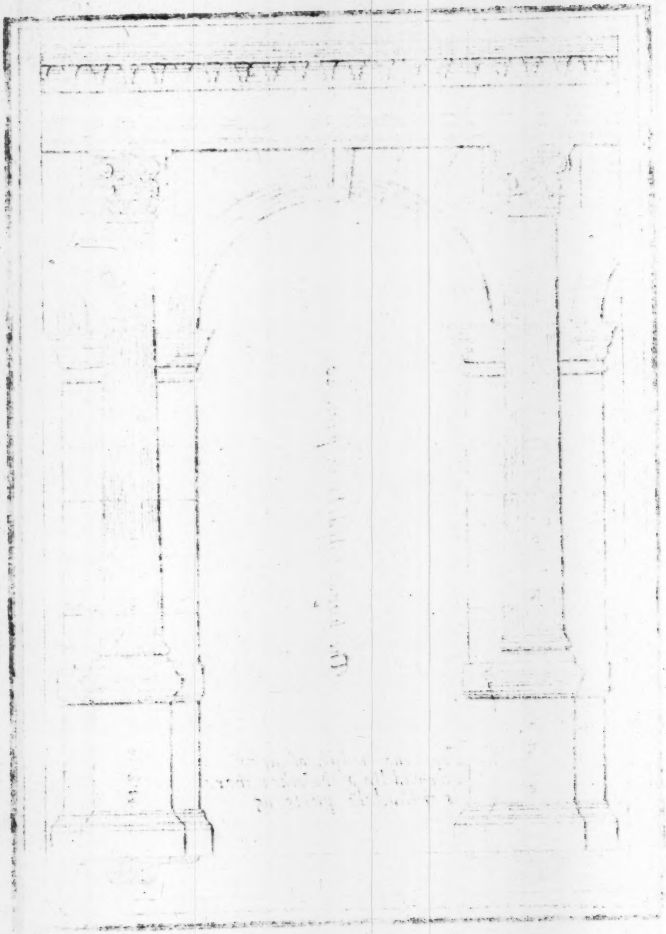
THe *Compoſita* Order, which is alſo called *Romain*, becauſe it was an Invention of the Ancient *Romains*, and is ſo called becauſe it partakes of two of the aforeſaid Orders; And the moſt Regular and Beautiful is that which is compounded of the *Ionick* and *Corinthian*; It is more ſlender then the *Corinthian*, and may be made like it in all parts, except in the *Capitel*.

Theſe Columnes ought to in length be ten *Models*; In the deſigne of Columnes alone, the Inter-columnes are one Diametre and a half, and this manner is called by *Vitruvius Picnoſtilos*. In thoſe of Arches the *Pillaſters* are half the light of the Arch, and the Arches are in height under the Vault two ſquares and half, that is to ſay, two Diametres and half of the light of the Arch.


M. 10.
M. 1
Mo. 1½
M. 1
M. 10.
M. 1 Mo . 1½ M. 1 Mo . 1½ M. 1 Mo . 1½ M. 1

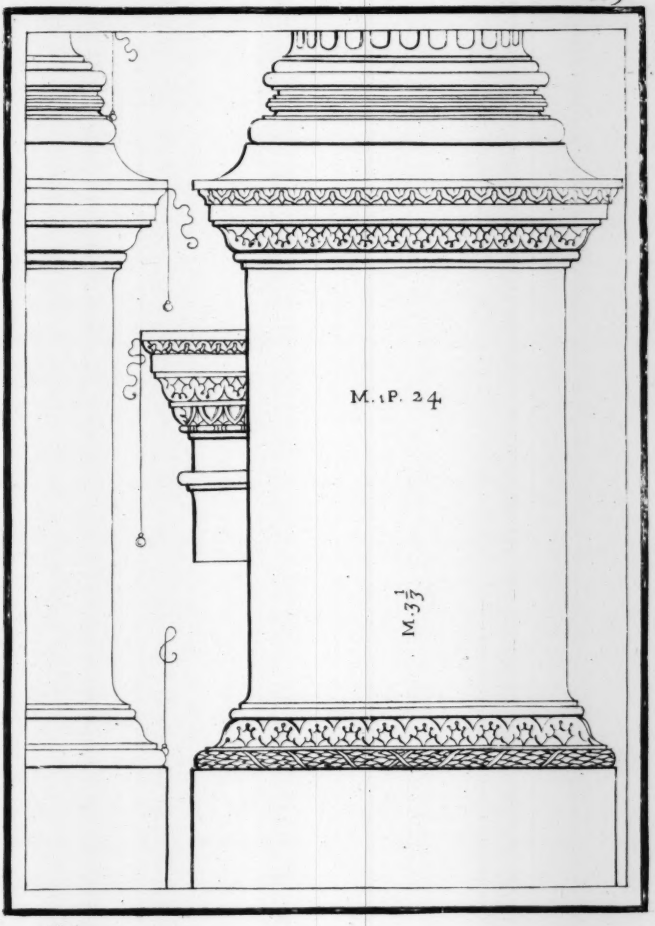
UMI

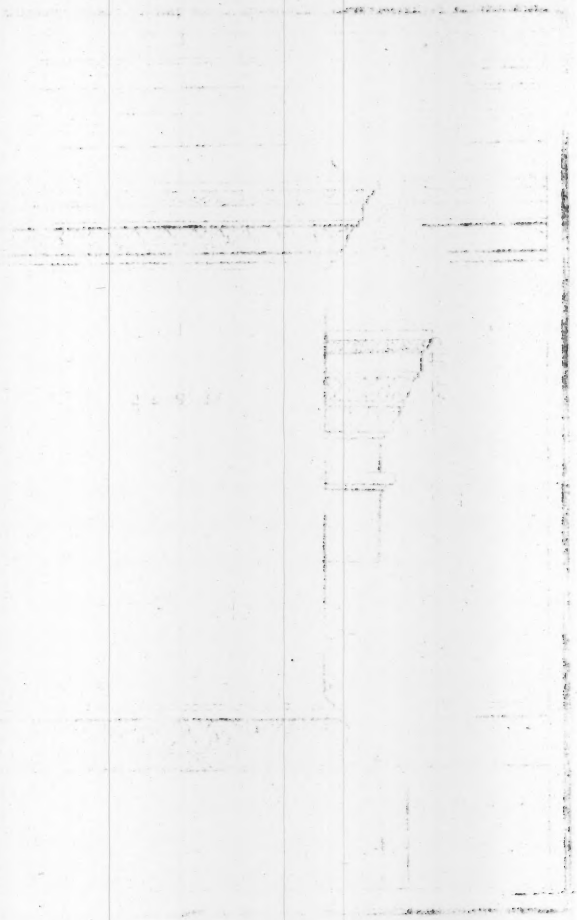

The height Models 12 parts 20
10 M
10 M
42M
20 M 3 M
20 M 3 M
From the Middle of one columne to the middle of the other there is 7 Models parts 15



And becauſe (as I have ſaid) this Order ought to be made more neat and ſlender then the *Corinthian*, Its *Pedeſtal* is to be the third part of the height of the Column, and is divided into eight parts and half; of one part is made the *Cimatium* of the *Baſe*, and five and half remaines to the *Dado* or *Plinth* of the *Pedeſtal*; The *Baſe* of the *Pedeſtal* is divided into three parts, two is given to the *Zocco* or *Plinth*, and one to its *Torus* with its *Cimatium*.

The Baſe of the Column may be made *Attick* as in the *Corinthian*, and it may alſo be commpounded of the *Attick* and the *Ionick*, as appears in the deſign. The *Profile* of the Impoſt of the Arches, is by the ſide of the plane of the *Pedeſtal*, and its height is as much as the thicknes of the *Membretto*.


M. 1P. 24
M. 3 1/2



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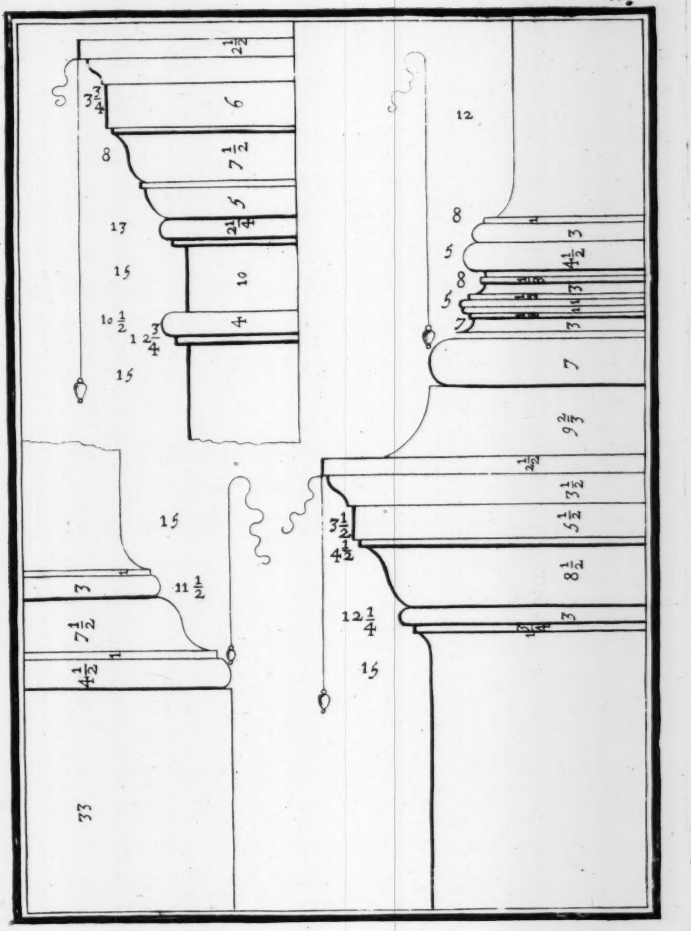
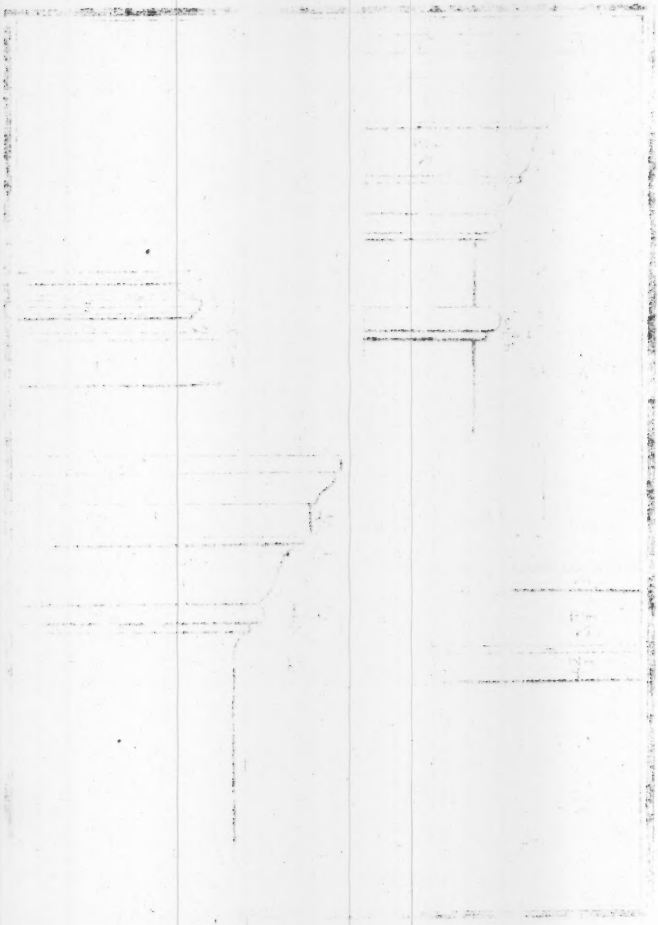

2½
3¾
6
8
7½
5
2¼
17
15
10
10½
1
2¾
4
15
12
8
5
3
4½
8
5
3
3
7
9½
2½
15
3½
5½
3½
4½
8½
11½
3
7½
12¼
3
4½
15
33

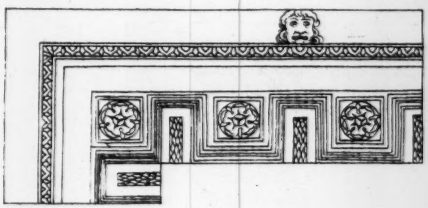


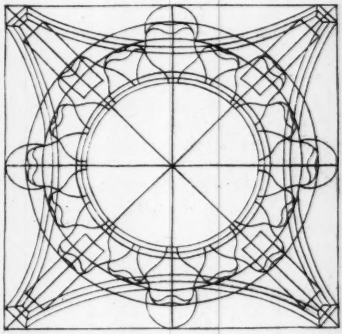
The Capitel of the *Compoſita* Order hath the ſame meaſures as the *Corinthian*, but it differs from it in the *Voluta*, *Ouolo*, *Fuſarolo*, or *Fuſe*, which are members attributed to the *Ionick*; and the way of making it, is thus: from the *Abacus* downwards, the Capitel is divided into three parts, as in the *Corinthian:* The firſt is given to the firſt leaves, the ſecond to the ſecond, and the third to the *Voluta*, which is made in the ſame manner, and with the ſame points with the which the *Ionick* is ſaid to be made, and takes up ſo much of the *Abacus*, that it ſeemes to grow out of the *Ouolo* neere the flowers which are put in the middle of the Curvatures of the ſaid *Abacus*, and is as thick in the front, as is the breadth of the hornes thereof, and a little more: The *Ouolo* is as big as three parts of five of the *Abacus*, and its lower part begins right againſt the lower part of the eye of the *Voluta*; It hath in *projecture* $\frac{1}{4}$. parts of its height, and is with its *projecture* perpendicular to the hollow of the *Abacus*, or a little more.

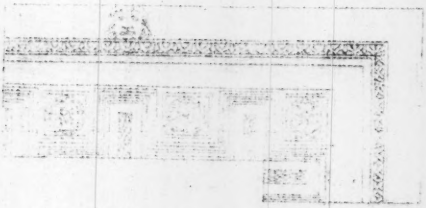
The *Fuſe* is a third part of the height of the *Ouolo*, and hath in *projecture* ſomething more then the half of its thickneſſe, and turnes about the Capitel under the *Voluta*, and is alwayes ſeen. The *Gradetten*, or Moulding, which goes under the *Fuſe*, and makes the *Orlo* of the bell of the Capitel, is the half of the *Fuſe*: The body of the bell anſwers direct with the bottom of the flutes of the Column; Of this ſort I have ſeen one at *Rome*, from which ſort I have drawn the ſaid Meaſures, becauſe it appeared to me very beautiful, and well ordered.

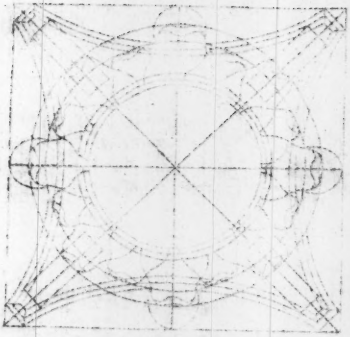
There are Capitels made after another manner, which may be called *Compoſita*, of which ſhall be diſcourſed, and the figures thereof ſhall be put in my Books of Antiquities.

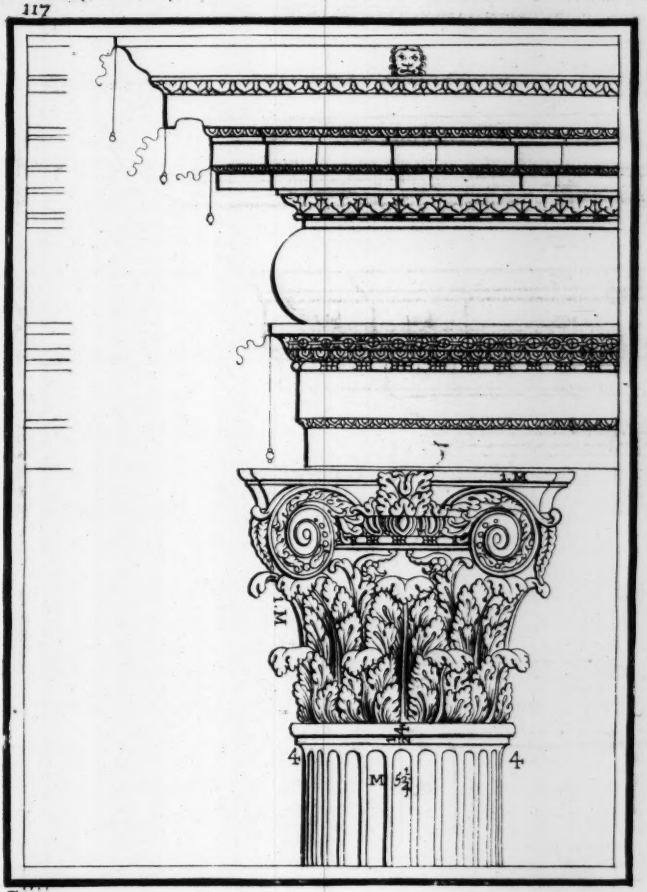
The *Architrave*, *Frize*, and *Cornice*, are the fifth part of the height of the Column, and their Compartiments may be well known by that which hath been ſaid before in the other Orders, and by the numbers placed in the deſigne.










1.M
1.M
4
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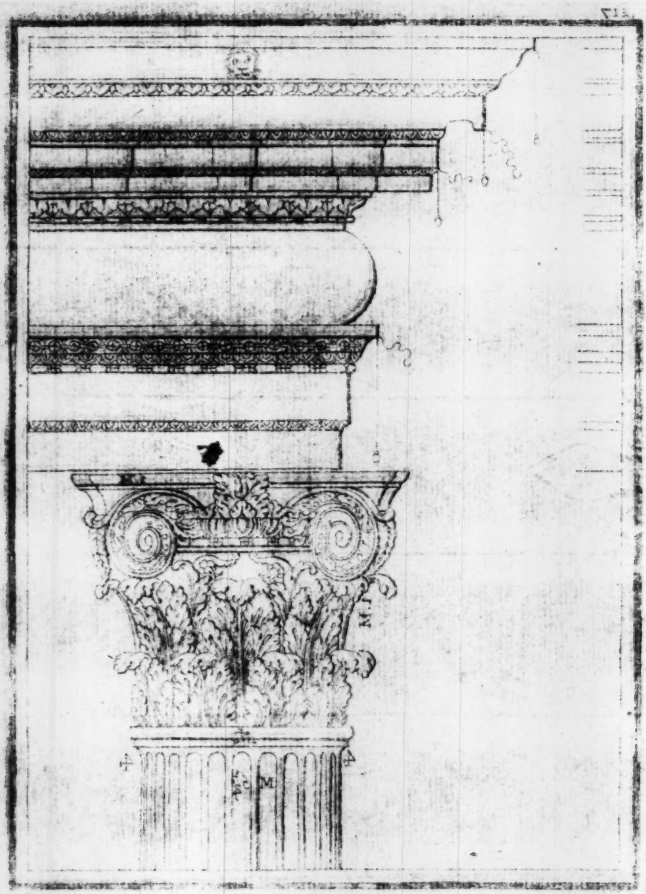
M 5 1/2



2½
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9
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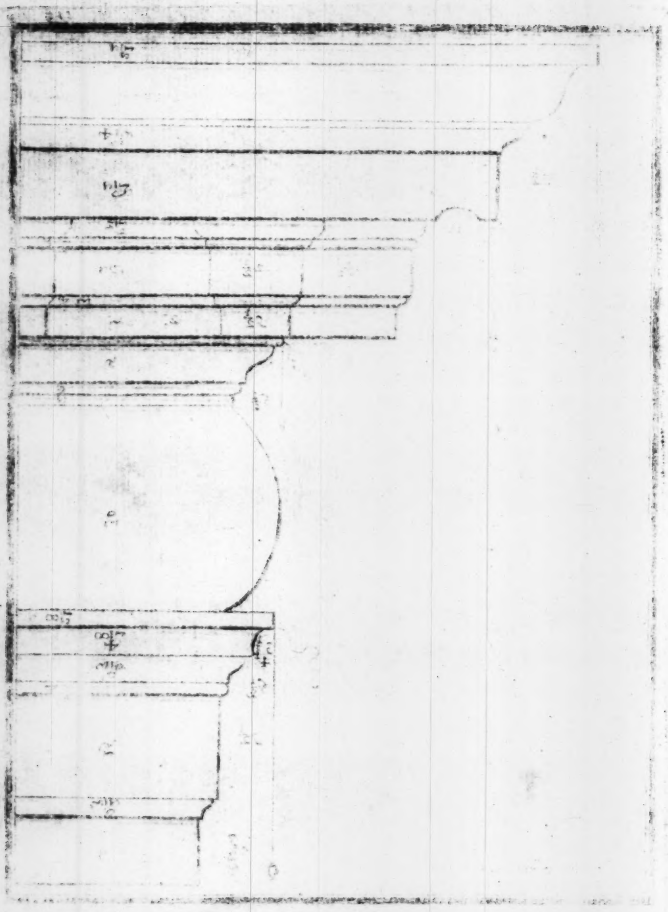


CHAP. XIX.

Of Pedeſtalls.

HItherto I have diſcourſed (what to me ſeemed convenient) of Walls and their Ornaments; and in particular, touching the *Pedeſtals* which may be applied to every Order; But becauſe it appears that the Ancients had not a regard to make the *Pedeſtal* bigger for one Order then for another, although this part much adds to the Beauty and Ornament, when it is made with diſcretion and proportion to the other parts; To the end that the Architects may take notice and ſerve themſelves upon occaſion, and know that they made them ſometimes ſquare, that is to ſay, as long as broad, as in the Arch *DiLioni*, at *Verona*. And theſe I have aſſigned to the *Dorick* Order, becauſe it requires Solidity; Sometimes they are made taking the meaſure from the light of the Arch, as in the Arch of *Titus* at *Santta Maria Nova* in *Rome*, and in that of *Trajan* on the gate of *Ancona*, where the *Pedeſtal* is half the height of the light of the Arch; and of that kind of *Pedeſtal* I have put to the *Ionick* Order; and ſometimes they took the meaſure from the height of the Column, as is ſeen at *Suſa*, a City ſcituate at the foot of the Mountain which divides *Italy* from *France*, In an Arch made to the honor of *Auguſtus Cæſar*, and in the Arch of *Pola*, a City of *Delmatia*, and in the Amphitheatre of *Rome*; In the *Ionick* and *Corinthian* Order, in which buildings the *Pedeſtal* is the fourth part of the height of the Column, as I have made in the *Corinthian* Order. In *Verona*, in the Arch *Di Caſtel Vecchio*, which is very beautiful, the *Pedeſtal* is a third of the height of the Column, as I have put in the *Compoſita* Order; And theſe are the handſomeſt formes of *Pedeſtals*, and have the beſt proportion with their other parts: And when *Vitruvius* diſcourſing of Theatres makes mention of the *Poggio*, you may know that the

Poggio is the same with the *Pedestal*, which is the third of the length of the Column put for Ornament of the Scene; But of *Pedestals* which exceed a third of the Column, such are seen at *Rome* in the Arch of *Constantine*, where the *Pedestals* are two parts and half of the height of the Column; And almost in all the Ancient *Pedestals*, the Bases are observed to have been made twice as big as the *Cimacium*, as is seen in my Book of Arches.

CHAP. XX.

Of Errours.

HAving set down the Ornaments of Architecture, that is to say, the Five Orders, and shewed how they are made and laid down, the Profiles of each of their parts, which I found that the Ancients did observe; It seemes to me not unfit here to acquaint the Reader of many abuses, which being brought in by the Barbarous are yet observed, to the end that the studious in this art may avoid them in their own Workes, and understand them in others.

I say then, that Architecture (as all other arts are) being Imitatrix of Nature, accounts nothing tollerable which is estranged, and differs from that which is natural; Wherefore we see that those Ancient Architects who built with Timber, when they began to build with stone, directed that the Columnes might be lesse at the top then at the foot, taking example from Trees, which are all lesse at the top, then in the trunk and near the root. Likewise because it is very convenient that those things upon which any great weight is put should be pressed, under the Column they put a *Base*, which with their *Torus* and *Scotia*,

seem

ſeem by the burthen over them to be ſwelled; ſo alſo in the *Cornices*, they bring in the *Triglifes*, *Modiglions*, and the *Dentills*, which ſhould repreſent the heads of the Joices, which in the ſealing are placed to bear up the Roof. The ſame may be obſerved in all other parts, if you are curious: And being ſo you cannot but blame that form of building which deviates from that which Nature inſtructeth, and from that ſimplicity which is directed in things by her produced, framing (as it were) another nature, and departs from the true good and handſome manner of building; For which reaſon you ought not (inſtead of Columnes or *Pillaſters*, which are to bear up ſome great weight) to place *Cartouches*, which are certain Scroles, which to the intelligent ſeem deformed, and to the ignorant rather confuſion then pleaſure, nor do they produce other effects, then increaſe the charge of the Builders. Likewiſe you muſt not make any of thoſe *Cartouches* come out of the *Cornice*; for it is requiſite that all the parts of the *Cornice* be made to ſome end, and to make appear what it would be if the work were framed of Timber. And beſides, being it is convenient that to uphold a great weight ſomething ſolid and fit to ſupport that weight be required, queſtionleſſe thoſe *Cartouches* are altogether ſuperfluous, becauſe it is impoſſible that any Timber what ever could really perform what theſe ſeem; for feigning it ſelf to be ſoft and gentle, I know not by what rule they put them under any thing heavy and hard. But that which (in my opinion) imports much, is the abuſe in making Frontiſpieces of Doores, Windowes and Galleries, divided in the middle, becauſe they were made to defend the inhabitants from rain; I know nothing more contrary to natural reaſon, then to divide and open that part which the Ancients inſtructed by neceſſity it ſelf did make whole, and raiſed in the middle, to ſhew that it ought to ſerve to defend the inhabitants of the houſe, and thoſe that enter therein, from Rain, Snow and Haile. And although Variety and Novelty ſhould pleaſe all, yet we are not to go againſt the precepts of Art, and that which Reaſon demonſtrates; Whence we ſee that although the Ancients did vary, yet never departed from the general and neceſſary Rules of Art, as may be ſeen in my Books of Antiquities: Alſo concerning the pro-

jecture of the *Cornice* and other Ornaments, 'tis no small abuse in making them come too forward, because when they exceed that which according to Reason is fit for them, especially if they be in a close place they seem narrow, and uncomely, and put fear in those which stand underneath, threatning alwayes to fall, you ought as much to avoid making the *Cornice* disproportionable to the Column, putting great *Cornices* upon little Columnes, or upon great Columnes little *Cornices*, who doubts but that such a building will seem very ill favoured. Besides, to make the Columnes seem to be of several parts, making rings and wreathings about them, as it were to hold them together, ought as much as may be to be avoided; because how much the more intire and strong the Columnes appear, so much the more they perform the design for which they are placed, which is to render the work above secure and firm. Many other like abuses might be reckoned up, as of some members which in the *Cornices* are made disproportionable to the other, whichby what I have shewed before, and by that which is now said may be easily known; it remaines now to come to the disposing of the particular and principal parts of the building.

CHAP. XXI.

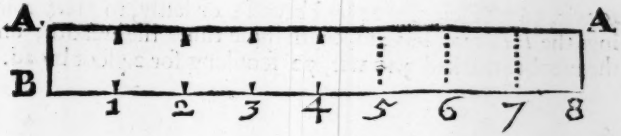
Of Galleries, Entries, Halls, Anti-Chambers *and* Chambers, *and of their proportions.*

GAlleries, for the most part, are wont to be made on the wings and sides, or on the front; They serve for many accommodations; as Walking, Eating, and other Divertisements, and they are made bigger or lesser, according to the greatnesse and conveniency of the building; But ordinarily, they ought not

not to have leſs then 16. 18. and 20. foot in beadth, and in great buildings unto 24. and their length at leaſt five times their breadth, ſix, ſeven, or eight times at moſt.

Example.

Let A A repreſent a *Gallerie*, the breadth whereof is A B; you muſt give it in length five times its breadth unto the number marked 5; or ſix times unto the number 6; or ſeven times unto the number 7; laſtly, eight times unto the number 8, which is the greateſt length allowed to *Galleries*.



And beſides, every Houſe well compoſed ought to have in the middle and chiefeſt part ſome place, to the which all the other parts of the houſe may relate and appertain; which place vulgarly is called *Entry*, *Lobby*, or *Paſſage* if it be below, and the *Hall*, if it be above; and is in the Houſe as a common place, for it ſerves to entertain thoſe who attend the Maſters going forth to ſalute him and negotiate with him; and ſuch places are firſt part of the Houſe that preſent themſelves to thoſe that would enter therein. The *Halls* ſerve for Feaſts, Nuptials and Banquets, to Act Comedies, and to take other ſuch like pleaſures and enjoyments; Therefore it is, that theſe places ought to be greater then other, and of a Capacious form, to the end that many perſons may commodiouſly be there entertained, and behold what is done.

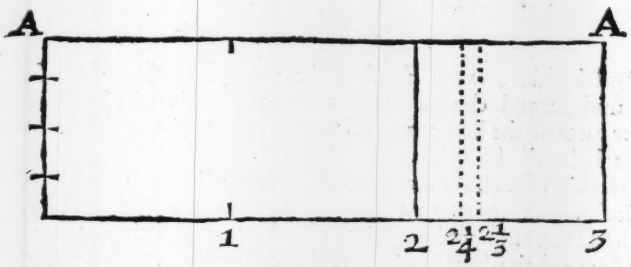
Of the proportion which the Halls ought to have.

As for my part, I have not been accuſtomed to allow to the length of *Halls* leſſe then twice their breadth, or twice and $\frac{1}{3}$. or a third

a third part of the breadth at moſt. And to great buildings you may allow the length to be three times the breadth, whereupon they will be ſo much the more beautiful and convenient.

Example.

Let A A repreſent a *Hall*, the breadth whereof is A B. having 24 foot, within the work you may allow the length, twice the breadth unto the number marked 2, to wit, 48 foot in length, for 24 foot in breadth, or twice the breadth, and $\frac{1}{4}$. more unto the number marked $2\frac{1}{4}$. to wit, 54 foot long for 24 foot broad, or twice the breadth, and $\frac{1}{3}$. more unto the number marked $2\frac{1}{3}$. to wit, 56 foot long for 24 foot broad; or laſtly, to great buildings the *Hall* may have in length three times the breadth, unto the number marked 3. to wit, 72 foot long for 24 foot broad.



The *Anti-Chambers* and *Chambers* ought to be ſo divided, that they may fall on each ſide of the *Entry* and of the *Hall*; and you muſt take heed that thoſe on the right hand may anſwer and be equal to thoſe on the left; to the end, that the building may be on one ſide as on the other, and the walls bear equally the burthen of the roof.

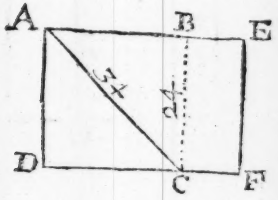
Of the proportions of Anti-Chambers.

A well proportioned *Anti-Chamber* ought to have in length the *Diagonal* line of the ſquare of the breadth, or the breadth and $\frac{1}{2}$. at moſt

Example

Example of the first bigneſſe from Anti-Chambers.

Let A B C D be a ſquare, whereof each ſide is 24 foot, and the *Diagonal* line thereof being drawn A C the ſame length that the *Diagonal* is of, you muſt give to the ſaid *Anti-Chamber* from A unto E, and from D unto F, in this manner.

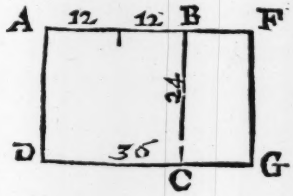


The *Anti-Chamber* will have 34 foot in length, to 24 foot in breadth.

Exam-

Example of the ſecond bigneſs of Anti-chambers.

Let A B C D be a ſquare, of which each ſide is 24 foot as before, add to the ſaid A B. D C the half their length, to wit, 12 foot from B to F, and from C to G, you ſhall make the *Anti-Chambers*, 36 foot in length to 24 foot in breadth.



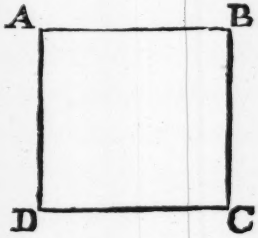
Of the Proportion of Chambers.

As for the *Chambers*, you may make thereof five ſorts and proportions; for they are either ſquare, or they may be in length their breadth with an eight part, a ſeventh, a ſixth, or a fifth part above their breadth.

Example

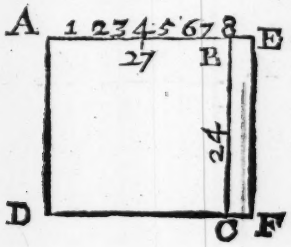
Example of the First bigneſſe of Chambers.

Let A B C D be a perfect ſquare, of which the 4 ſides and the 4 Angles may be equal, this ſhall be the bigneſſe of the *Chamber*.



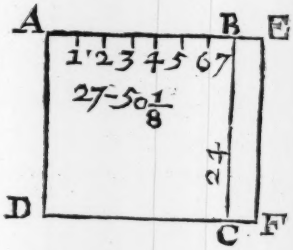
Example of the Second.

Let A B C D be a ſquare, whereof each ſide is 24 foot, you may divide one of the ſaid ſides into 8 equal parts, whereof each may be 3 foot, add one of the ſaid parts to the ſide A B and continue it to E, and as much to the ſide D C, continue it to F and you will make the *Chamber* 27 foot long to the 24 foot broad.



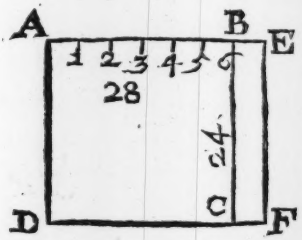
Example of the Third.

Let A B C D be a ſquare, as before, of 24 foot; to each ſide, divide the ſide of *A B* into ſeven equal parts, and add to it one, continuing the ſame to E, and the ſide D C unto F, the ſaid *Chamber* will have 27 foot 5 inches and $\frac{1}{8}$ part in length to 24 foot in breadth.



Example of the Fourth.

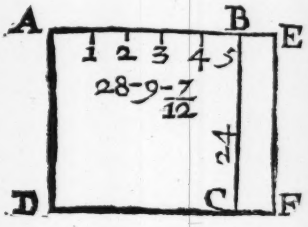
Let A B C D, as before, be a ſquare, having to each ſide 24 foot; divide one of the ſides, as A B into ſix equal parts, add therunto one of the ſaid parts, drawing the ſaid ſide unto E, and D C unto F, you will make the *Chamber* 28 foot long to 24 foot broad.



Example

Example of the Fifth and last bigneſſe of Chambers.

Let the ſquare A B C D be, as before, each ſide thereof to be 24 foot, divide one of the ſides into five equal parts, add one of the ſaid parts drawing the ſide A B unto E, and D C unto F, you will make the *Chamber* 28 foot 9 inches, and $\frac{7}{12}$ in length to 24 foot in breadth.



CHAP. XXII.

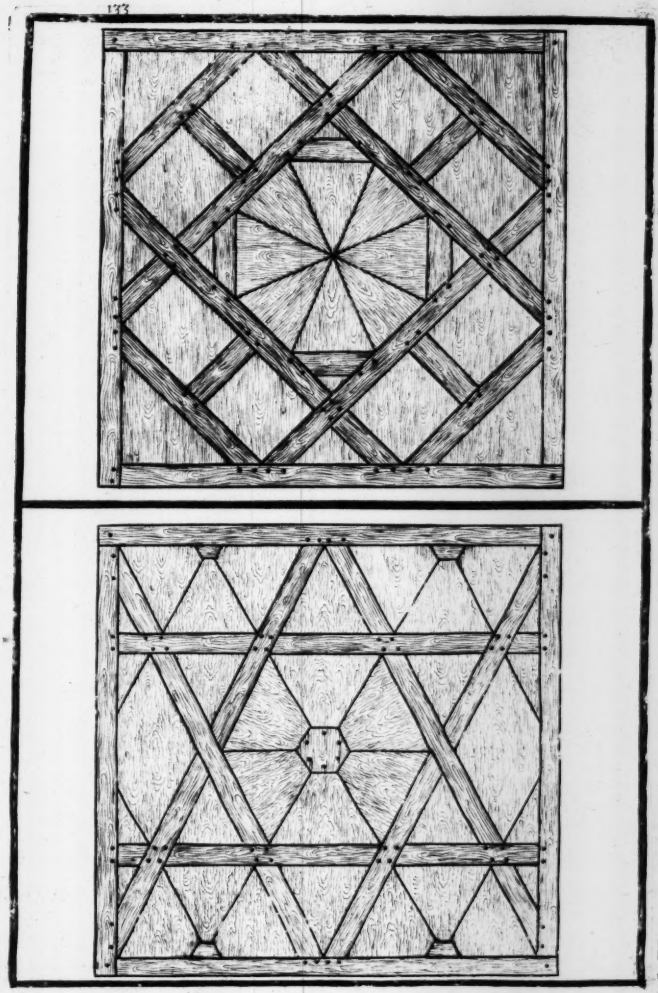
Of Floores *and* Superficies, *of* Departements, Planchers, *and* Flat Seelings.

AFter having ſeen the formes of *Galleries*, *Halls*, *Anti-Chambers* and *Chambers*, it is needful to diſcourſe of *Floores* or *Superficies*, of *Departements*, *Planchers*, and *Flat Seelings*.

Floores or *Superficies*, may be of ſquare tyles or hard ſtone, or of Marble, or ſmall ſquares of Carpenters work, and may be made of divers ſorts, and divers colours, according to the variety of the materials, which renders them very agreeable to the eye: In lodging *Chambers* they are ſeldom made of Marble or other hard ſtone, becauſe in the *Winter* they will be too cold; But in *Galleries*, or other publique places, they will agree very well.

This ſort of Floores *of ſmall ſquares of Carpenters work, may be ſeen at* Somerſet-Houſe, *of which, being a novelty in* England, *I thought good to preſent the Deſign thereof, although not in my Author.*

You



You must take heed that the *Halls*, *Anti-Chambers*, and *Chambers*, which are of the same story, may have all the Floores or Pavements equal in such manner, that the thresholds may not be higher then the rest.

The *Planchers* are also made of divers wayes, for some there are that take pleasure to make them very handsome of well wrought Joists; where you may take notice that the Joists must be distant the one from the other, the thickness of a Joist and half, and so the seeling will be very handsome: And there will be so much wall between the ends of the Joists, as will be sufficient to bear up the wall about it; Whereas if they stand wider one from the other, it will be very ill favoured; and if closer 'twill be as a dividing of the upper wall from the lower; and if the Joists rot or be consumed with fire, the wall of necessity must be ruined.

Others will have Compartements of Plaister, or wood, inriching them with pictures and gilded work, and beautifie them according to their various humours; Wherefore in this there can be given no certain and determinate rules.

CHAP. XXIII.

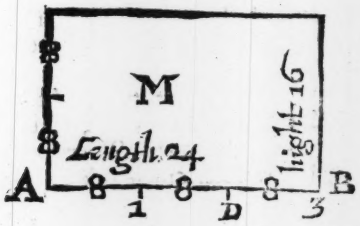
Of the height of Halls, Anti-Chambers, *and* Chambers.

Halls, *Anti-chambers*, and *Chambers*, are made either arched or flat: if you make them flat, divide the breadth into three parts, and two of those parts shall be the height of the Story, from the floor to the Joist.

Example

Example of the first height of Halls, Anti-Chambers, *and* Chambers.

Let the figure M represent the Chamber whose height you would find, which suppose to have in breadth 24. foot within the work, which shall be divided upon the line A B, into three equal parts with points, where is marked the numbers 1 2 3. each part being eight foot, two of each prats shall be the height of the Chamber, to wit, 16. foote from the Floore to the Joist.



And if you would have it higher, the breadth must be divided into seven parts; take thereof five, which will give the height.

Exam

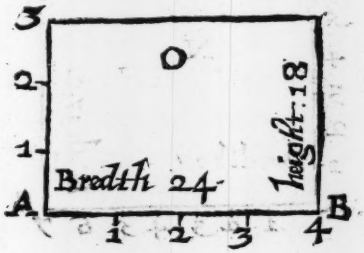
Example of the ſecond height.

Let the figure N be of the ſame breadth as the foregoing, to wit 24 foot within the work, which ſhall be divided upon the line A B into ſeven equal parts, take thereof five to make the height of the Story A C, and B D, the ſaid height will be 17 foot 2 inches, from the Floore unto the Joiſts.

Or divide the ſaid height into 4 parts, and three of thoſe parts will likewiſe give a greater height.

Example of the third height, yet higher.

Let the figure O be of the same breadth as the former, to wit of 24 foot within the work, which shall be divided upon the line A B, into four equal parts, three thereof you must take for the height of the Story, so it will be of 18 foot from the Floore to the Joist.



CHAP. XXIV.

Of the Proportion of the height of Chambers *of the second Story.*

THe height of *Chambers* of the second Story shall be a twelfth part lesse then the *Chambers* below.

Example of the height of the Second Story in the Figure marked M.

Be it, as it is said in the Figure marked M, its first Story of 16 foot, from the Floore to the Joist, divide the said 16 foot into twelve

twelve equal parts, take eleven which will make 14 foot 8 inches for the height of the second Story, from the Floore to the Joist.

Example of the Second Story of the Figure marked N.

Be it as it is said in the Figure marked N, its first Story of 17 foot 2 inches high, from the Floore to the Joist divide the said 17 foot 2 inches into twelve equal parts, take thereof 11, which will make 15 foot 7 inches, for the height of the second Story from the Floore to the Joist.

Example of the height of the second Story of the Figure O.

Be it, as it is said in the Figure O, its first Story of 18 foot from the Floore to the Joist, divide the said 18 foot into twelve equal parts, take thereof 11, which will make 16 foot and ½ for the height of the second Story from the Floore to the Joist.

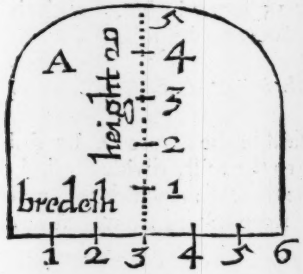
CHAP. XXV.

Of the Proportion of Halls, Anti-Chambers, *and* Chambers, *of the first Story which are Arched.*

IN great Buildings the *Halls*, *Anti-Chambers*, and other Roomes of the first Story may be arched, whereupon they will be much more handsome, and lesse subject to fire: Their height is made by dividing the breadth into six parts, and thereof take five, which will give the height that it ought to have from the Floore or Superficies unto the bottom of the key of the Arch.

Example of the first height of Halls, Anti-Chambers, *and* Chambers, *which are Arched.*

Let the Figure marked A be of 24 foot in breadth more or leſſe, and be divided into ſix equal parts; take thereof five, which will make it 20 foot high, from the Floore unto the bottom of the key of the Arch.



And if you would have one higher, you muſt divide the ſaid breadth into eight parts, and ſeven thereof ſhall be the height.

Example

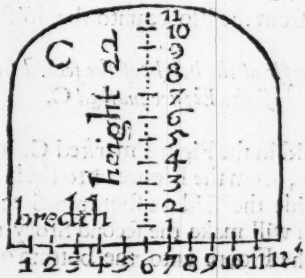
Example of the second height.

Let the Figure B having the same breadth as the former of 24 foot within the work, be divided into eight equal parts, and take thereof seven which will make 21 foot for the height from the Floore unto the bottom of the key of the Arch.

And if you divide the said breadth into 12 parts, you must take thereof 11 which will make it higher.

Example of the third yet higher.

Let the Figure C be of 24 foot broad within the work, as the former divide the 24 foot into 12 equal parts, take thereof 11 which make 22 foot in height, from the Floore into the bottom of the key of the Arch.



CHAP.

CHAP. XXVI.

Of the Proportion of the height of Chambers *of the ſecond Story.*

THe *Chambers* of the ſecond Story muſt be raiſed a ſixth part leſſe then the *Chambers* below.

Example of the height of the ſecond Story of the Figure marked A.

Be it, as it is ſaid in the Figure marked A, its firſt Story of 20 foot in height, from the Floore unto the bottom of the key of the Arch, divide the ſaid 20 foot into ſix equal parts, take thereof five which will make the ſecond Story 16 foot eight inches from the Floore to the Joiſt.

Example of the height of the ſecond Story of the Figure marked B.

Be it, as it is ſaid in the Figure B, its firſt Story of twenty and one foot in height, from the Floore unto the bottom of the key of the Arch, divide the ſaid 21 foot into ſix equal parts, take thereof five, which will make the ſecond Story 17 foot 6 inches in height, from the Floore unto the Joiſt.

Example of the height of the ſecond Story of the Figure marked C.

Be it, as it is ſaid in the Figure marked C, its firſt Story is of 22 foot in height, from the Floore unto the bottom of the key of the arch, divide the ſaid 22 foot into 6 equal parts, take thereof five which will make the ſecond Story 18 foot 4 inches in height, from the Floore unto the bottom of the key of the Arch.

CHAP.

CHAP. XXVII.

Of the Proportion of the third Story.

IF you would make above the ſecond Story, an Attique or third Story: The ſecond muſt alwayes be divided into twelve equal parts, nine whereof will give the height of the third Story, from the Floore unto the bottom of the Joiſt.

In the building of *Chambers* you ought to have regard as well to the place of the bed, which is uſually ſix or ſeven foot ſquare, and the paſſage, as well as to the ſcituation of the Chimney, which for this conſideration ought not to be placed juſt in the middle, but diſtant from it about two, or two foot and ½, to the end it may make room for the bed, and by this means the inequality is little diſcerned if it be not in buildings, the breadth at leaſt of 24 foot within the work; And in this Caſe it may be placed juſt in the middle.

CHAP. XXVIII.

Of the height of Galleries.

THe lower *Galleries* muſt be as high as the *Halls*, *Anti-Chambers*, and *Chambers* of the firſt Story, to the end that one may enter therein on even ground, which is to be underſtood then, when the ſaid lower *Galleries* hath the ſame framing, which the ſaid *Halls*, *Anti-Chambers*, and *Chambers*, whoſe Floores ought ordinarily to be raiſed higher then the ground-work of the Court about two foot at leaſt, or of three or four foot; And is aſcended by ſteps, which ought not to have more then ſix inches in height, nor leſſe then four, and in breadth one foot, or at the moſt 15 or 16 inches.

But

But if the *Galleries* be made all open, ſo as they enter into it from the Court; In this caſe you may lay the Floore lower then the neighbouring Roomes, and 'tis ſuffice that the ſaid Floore be one foot higher then the ground work of the Court; Thus doing 'twill appear very graceful; for by this meanes they come neere to the fair proportion which they ought to have in their height from the Floore or Superficies unto the bottom of the key of the Arch; And their Entrance is by ſteps which are between the opening of the Arches.

CHAP. XXIX.

Of the juſt Proportion which the upper Galleries *ought to have.*

THe upper *Galleries* are made either flat or Arched, if flat, they muſt be as high as broad: *Galleries* which are arched muſt be as high as broad, with a fifth, fourth, or third part over, and above their ſaid breadth.

CHAP. XXX.

Of the Meaſures of Doores *and* Windowes.

THe certain and determinate Meaſures cannot be given of the height and breadth of principal *Gates* of Buildings: nor of *Doores* and *Windowes* of *Chambers*, becauſe, for to make the principal *Gates*, the Architect muſt accommodate them to the greatneſſe of the Building, and the quality of the Maſter, and the uſe that is to be made of them; Nevertheleſſe we will not omit to give the Meaſures following.

CHAP.

CHAP. XXXI.

Of the Propertion of Principal Gates.

PRincipal *Gates* of Entrance where Coaches and Wagons ought to passe, and other such necessaries must not have lesse then seven and ½, eight, or nine foot: and to great Buildings, unto ten or twelve foot in breadth.

Their height must be their breadth and half at least; And to have it well proportioned, you must give it in height twice their breadth.

CHAP. XXXII.

Of the Proportion of Inner-Doores.

D*Oores* within the House in the least Building, ought not to have lesse then two foot and ½ in breadth, and five foot and ½ in height: those from three to four foot broad must have in height twice their breadth; and to great Buildings you may allow even to five or six foot in breadth, and the height double, and sometimes a fifth or fourth part lesse then their breadth.

The Ancients were wont to make their *Doores* narrower above then below, as may be seen in a Church which is at *Tivoli*, which *Vitruvius* teacheth us; and 'tis likely they did so, to give them more force.

CHAP. XXXIII.

Of the Proportion of Windowes.

THe Appertures of *Windowes* muſt have foure foot and ½, or five foot, and to great Buildings unto ſix; between the two Jaumes their height muſt be at leaſt double their breadth; and to make them comely and well proportioned, a fourth part, a third, or a half part more then the breadth; And according to the bigneſſe of theſe, you may make all the reſt in the other roomes of the ſame Story; But thoſe of the ſecond Story ought to be lower by one twelf part then thoſe in the firſt; And if you make *Windowes* above them, you ought to make them a fourth part lower then thoſe in the ſecond.

CHAP. XXXIV.

Of the Proportion of the Soiles *and* Windowes.

THe *Soiles* of *Windowes* muſt have from two foot eight inches, unto three foot at moſt in height. The *Tranſoms*, or croſſe pieces of *Windowes*, muſt be four or five inches thick; Their *Rebates* muſt be from one inch and ½ unto two inches at moſt, to the end they may have greater ſtrength, and that the frames of wood which carry the ſhutters may have convenient ſtrength. The Jaumes of *Windowes* muſt be much rebated and let in from two inches, and ½ to three inches at leaſt, to the end that the wooden frames may be ſtrong, and joyne to the wall; when the wall is thin, the ſhutters of the *Windowes* ought to ſhut over the rebates the half or one third only; Alſo it is needfull to divide the ſaid ſhutters, that they may not be a hindrance to the Chamber, nor obſcure the light.

CHAP.

CHAP. XXXV.

Rules to be observed in making Doores *and* Windowes.

IN making *Windowes* you are to take heed that you do not give them more or lesse light then is necessary, nor make them wider or narrower then is needful; Wherefore you ought to have regard to the greatnesse of the places, which ought to receive the light, being evident that a great Room hath need of more light then a little one; So that if the *Windowes* be made lesse then they ought to be, the place will be obscure and dark. And becauſe in Houſes ſome *Chambers* are made large, ſome indifferent, ſome little, you muſt take great care that all the *Windowes* may be equal one with the other in their rank and Order, ſo that thoſe on the right hand may anſwer thoſe on the left, and thoſe above may be right over thoſe below. Likewiſe the *Doores* muſt be right over one another, to the end that the void may be upon the void, and the full upon the full: and moreover, let the *Doores* be placed in ſuch manner, that one may ſee from one end of the Houſe to the other, which is very gracefull: and beſides, 'tis cool in Summer, and hath many other conveniencies.

It is very ſecure to turn *Arches* over *Doores* and *Windowes*, which *Arches* do diſcharge and hinder that the *Doores* and *Windowes* be not preſſed with too much weight, which is of great importance for the laſting of Buildings.

The *Windowes* muſt be conveniently diſtant from the Corners and Angles of the Building, becauſe that part ought not to be open and infeebled, whoſe office is to ſupport and faſten all the reſt of the Building.

CHAP. XXXVI.

Of the just Proportion which the Pillasters *of* Doores *and* Windowes *ought to have in thickness and Projecture.*

Pillasters of *Doores* and *Windowes* ought not to be thicker then the fifth part of their Apperture, nor lesse then a sixth.

The *Projecture* of *Pillasters* in generall is found by dividing their thickness into six parts, and one of those parts must be the *Projecture* they ought to have.

It remaines to see their Ornaments.

CHAP. XXXVII.

Of the Ornaments of Doores *and* Windowes.

HOw to adorn the *Windowes* and principal *Doores* in Buildings may easily be known from that which *Vitruvius* teacheth in the sixth Chapter of his fourth Book, adding thereunto all that the most Reverend *Daniel Barbaro* hath said thereof, and shewen in design: And also of that which I have said before of all the five Orders; Therefore leaving that, I shall only put some designes of the Ornaments of *Doores* and *Windowes* of *Chambers*, so as they may be made divers wayes; And I shall mark particularly every member which is graceful, and how much *Projecture* is needful.

The

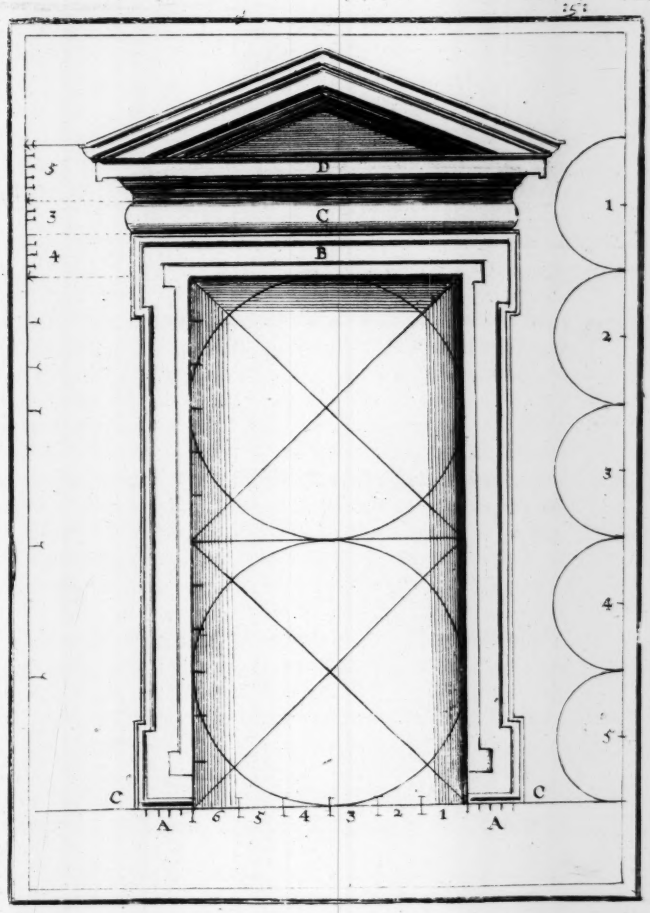
The Ornaments which are given to *Doores* and *Windowes*, are the *Archetrave*, *Frize*, and *Cornice*.

The *Archetrave* turnes about the *Doore* and ought to be as thick as the *Pillaster*, which (as I have said) ought not to be lesse then the sixth part of the Apperture, nor more then a fifth; and from the *Archetrave*, the *Frize*, and *Cornice*, take their thicknesse according to the two inventions which follow.

Example.

Let the breadth of the Apperture of the Doore A A, be divided into six equal parts, one of these parts shall be the *Archetrave* B, which windes about the *Doore*, and must be divided into four parts, of three thereof is made the height of the *Frize* C, and of five, that of the *Cornice* D.

The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The Measures of each member of the Ornaments may be found in this manner.

The *Archetrave* B must be divided into ten parts, three must be for the *Prima Fascia* G, four for the second V; and the three which remaines must be divided into 5: three for the *Scima Reversa* P, and and the other two for the *Orlo*, or *Regula* R, whose *Projecture* is the fourth part of its thickneſſe; The *Scima Reversa* P, hath in *Projecture* its height, and is marked in this manner: they draw a straight line which terminates at the end thereof, under the *Orlo* or *Regula* R, and on the second *Fascia* V, and is divided in half, so as each of these halfes is the Base of a Triangle of two equal sides; And on the Angle opposed to the Base must be placed the sixt foot of the *Compass*, and the *Curve lines* must be drawn, which make the said *Scima Reversa* P.

The *Frize* is three parts of four of the *Archetrave*, divided into four, and is designed of a portion of a *circle* lesse then the *semicircle*, the swelling whereof comes directly over the *Cimatium* of the *Archetrave*.

The five parts which are given to the *Cornice*, distribute themselves in this manner to its members: one to the *Scotia* with its *Listella*, which is of a fifth part of the said *Scotia*.

The *Scotia* hath in *Projecture* two thirds of its height; to design it they form a triangle of two equal sides, and to the angle G they place the Centre, and so the *Scotia* becomes the Base of the Triangle; another of the said five parts is for the *Ouolo*, and hath in *Projecture* the two thirds of its height, and is designed making a triangle of two equal sides, and the Centre is made at the point H; The other three parts are divided again into seventeen, eight for the *Coronna* with its *Lists*, of which that above makes one of the eight parts; and that which is below, and makes the hollow of the *Coronna*, makes one of the six parts of the *Ouolo*: The other nine are for the *Scima Recta*, and its *Orlo* or *Regula*, which is a third of the said *Scima*. To frame it so as it may be well and gracefull, they draw the right line A B, and 'tis divided into two equal parts: at the point C, one of those parts is divided into seven, whereof six are taken at the point D; then they form two Triangles, A E C, and C B F, and on the points E and F, they put the sixt foot of the Com-

paſs, and draw the portions of the Circles A C and C B, which make the ſaid *Scima*.

The *Archetrave* likewiſe, in the ſecond invention, is divided into four parts; of three is made the height of the *Frize*, of five that of the *Cornice*, then the *Archetrave* is divided into three parts, two of them are divided again into ſeven, of which ſeven three are for the firſt *Faſcia*, and four for the ſecond; And the third part of the *Archetrave* is divided again into nine parts, of two is made the *Aſtragal*, the other ſeven are divided into five parts; Three are the *Scima Reverſa*, and two the *Orlo* or *Regula*.

The height of the *Cornice* is divided into five parts and $\frac{3}{4}$ one of which is divided again into ſix parts, of five is made the *Scima Reverſa* above the *Frize*, and of the 6 the *Liſtella*; The *Scima Reverſa* hath as much *Projecture* as it is high, and the ſame alſo hath the *Liſtella*; The ſecond part of the height of the *Cornice* is for the *Ouolo*, which hath in *Projecture* $\frac{3}{4}$ of its height; The Moulding above the *Ouolo* is the ſixth part of the *Ouolo*, and hath the ſame *Projecture*; The other three parts of the height of the ſaid *Cornice* are divided into 17 parts, eight of which are for the *Coronna*, which hath in *Projecture* three parts of four of its height, the other nine are divided into four parts, three are for the *Cimatium*, and one for the *Orlo* or *Liſtella*; The $\frac{1}{4}$ which remaine are divided into five parts and $\frac{1}{2}$; of one is made the Moulding, and of four and $\frac{1}{2}$ the *Scima Reverſa* above the *Coronna*; The ſaid *Cornice* hath as much *Projecture* as it hath thickneſſe.

Members

Members of the *Cornice* of the first Invention.

I *Scotia.*

K. *Ouolo.*

L. *Coronna.*

N. *Cimatium.*

O. *Orlo*, or *Regula.*

Members of the *Architrave.*

G. *Prima Fascia.*

V. *Secunda Fascia.*

P. *Scima Reversa.*

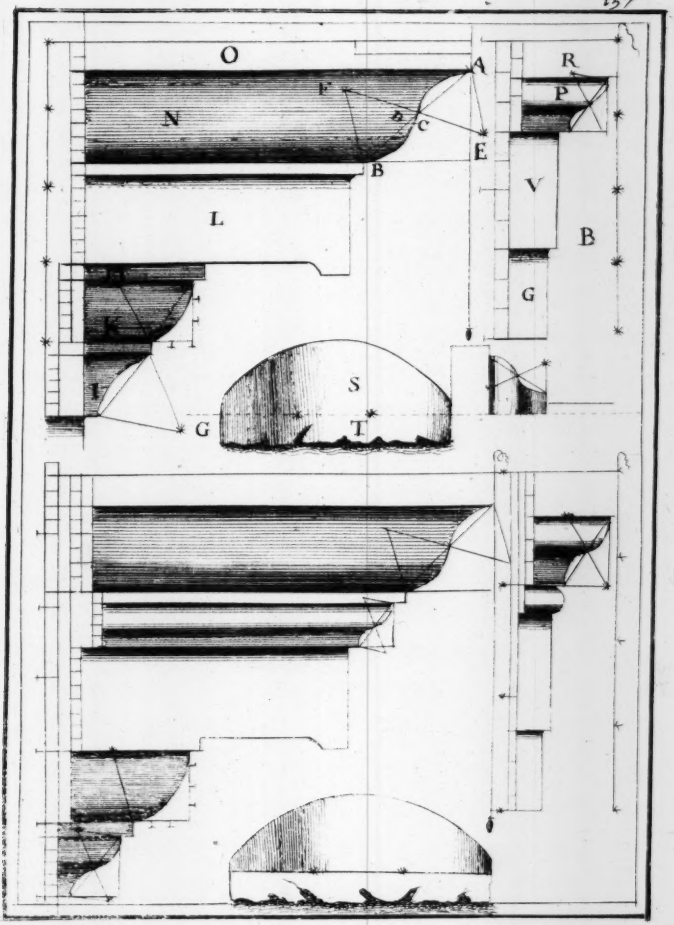
R. *Orlo*, or *Regula.*

S. *Swelling of the Frize.*

T. *Part of the Frize which enter into the wall.*

By the means of these two, you may know the members of the second Invention.

Of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Of these two other Inventions, the *Archetrave* of the first which is marked F, is likewise divided into four parts, of three and ¼ is made the height of the *Frize*, and of five that of the *Cornice*; The *Archetrave* is divided into eight parts, five are for the plaine of the *Archetrave*, and three for the *Cimatium*, which is divided again into eight parts; Three for the *Scima Reversa*, three for the *Scotia*, and two for the *Ouolo* or *Regula*; The height of the *Cornice* is divided into six parts, of two is made the *Scima Recta*, with its *Orlo* or *Regula*, and of another the *Scima Reversa*; the said *Scima Recta* is divided again into nine parts, of eight thereof are made the *Coronna* and the moulding; The *Astragal*, or *Rondeau* above the *Frize*, is a third of one of the said six parts, and that which remaines between the *Coronna* and the *Astragal*, is left for the *Scotia*.

In the other Invention the *Archetrave* marked H; is divided into four parts, and of three and ½ is made the height of the *Frize*, and five the height of the *Cornice*: The *Archetrave* is divided into eight parts, five of them are for the plain of the *Archetrave*, and three for the *Cimatium*, which is divided into seven parts, of one is made the *Astragal*, and the rest are divided into eight parts; three of which are for the *Scima Reversa*, three for the *Scotia*, and two for the *Orlo* or *Regula*; The height of the *Cornice* is divided into six parts, and ¼ of three are made the *Scima Reversa*. The *Dentells* and the *Ouolo*, the *Scima Reversa*, hath as much *Projecture* as it is thick: the *Dentells* are two of three parts of their height, and the *Ouolo* three of four parts. Of the ¼ is made the *Scima Reversa*, between the *Scima Recta* and the *Coronna*; And the three other parts are divided into seventeen, nine make the *Scima Recta*, and the *Orlo* or *Regula*, and eight the *Coronna*.

This *Cornice* hath as much *Projecture* as it hath thickness, as all the other aforesaid.

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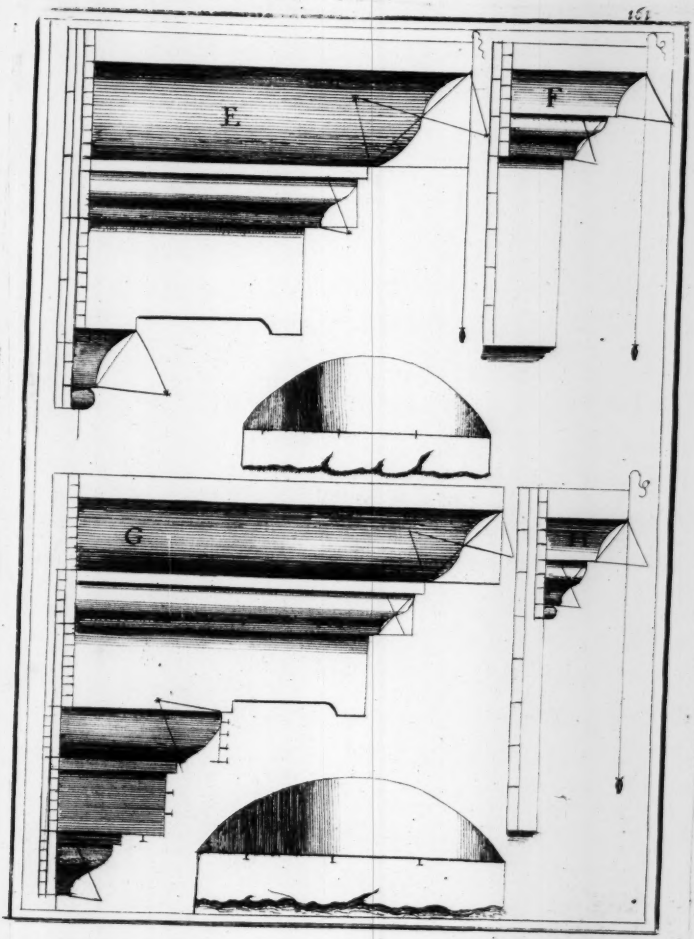
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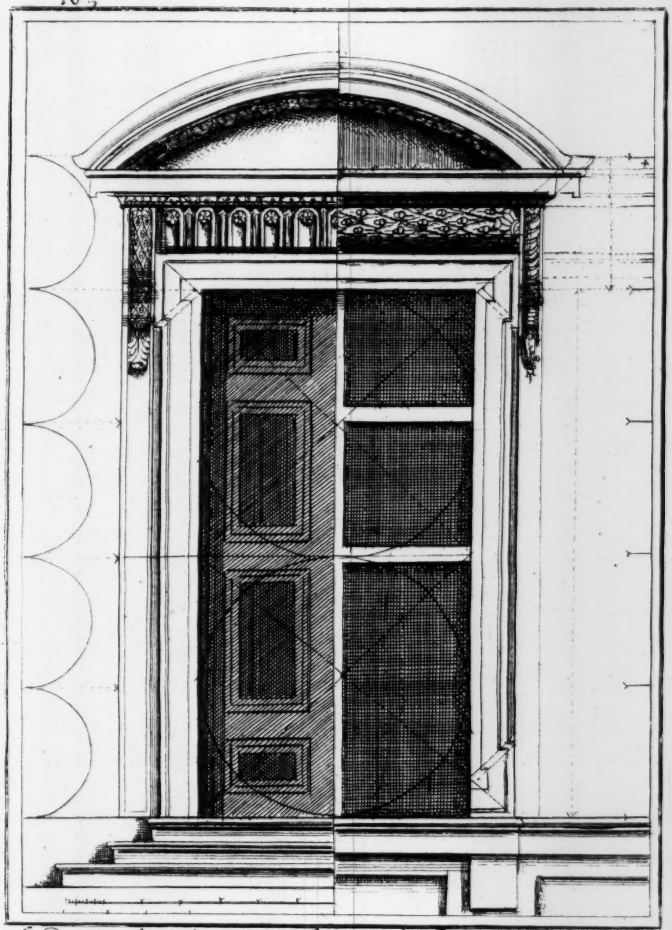
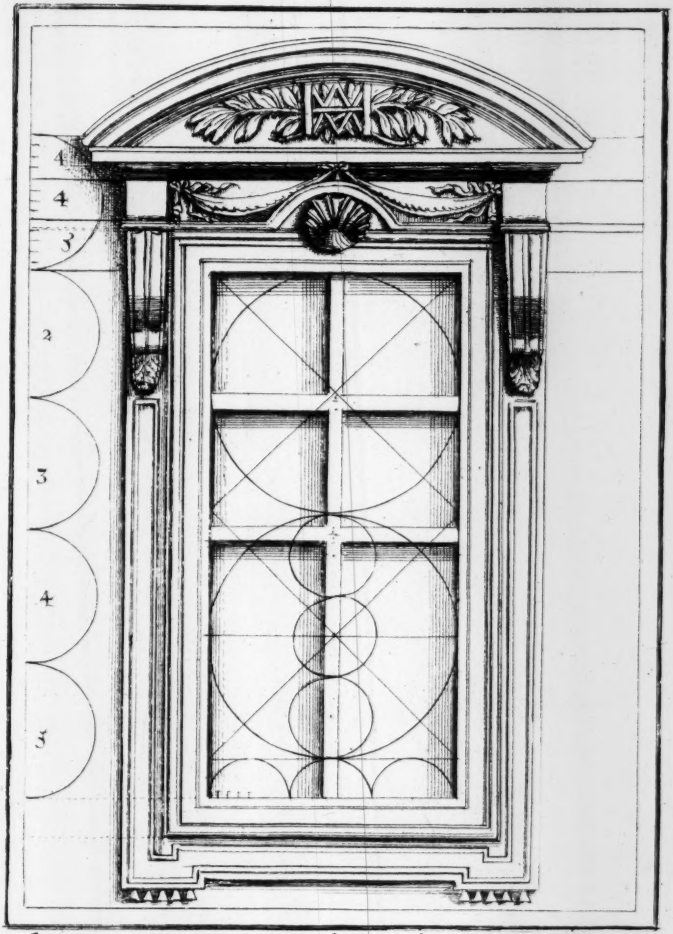
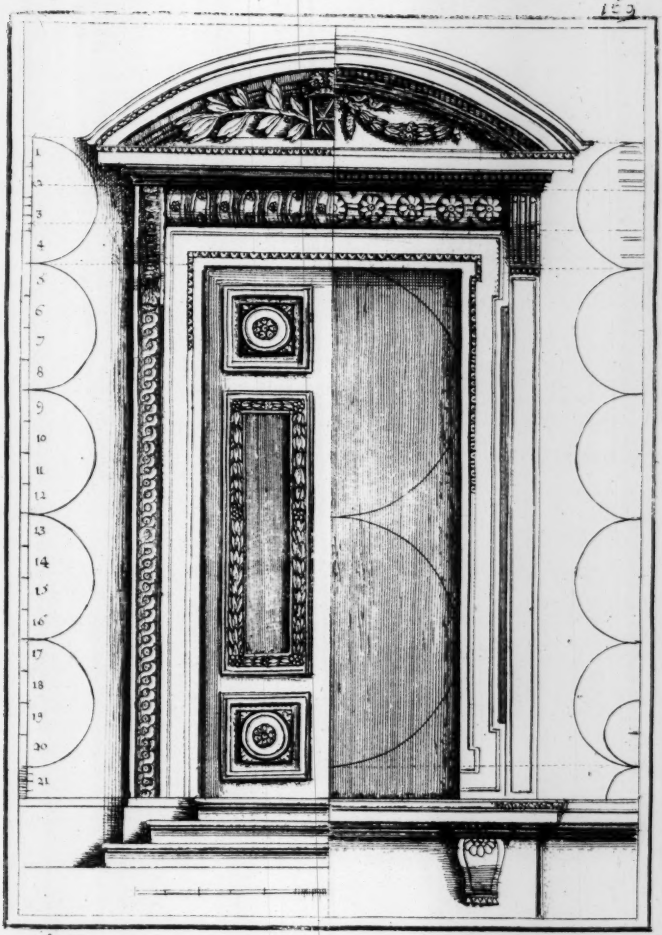
Demonſtration of ſome Figures of *Doores* and *Windowes*, according to the Five Orders of *Andrea Palladio*. And are in the Court of the *Levure* at *Paris*, the which expreſs the beauty of the fair proportions before mentioned.



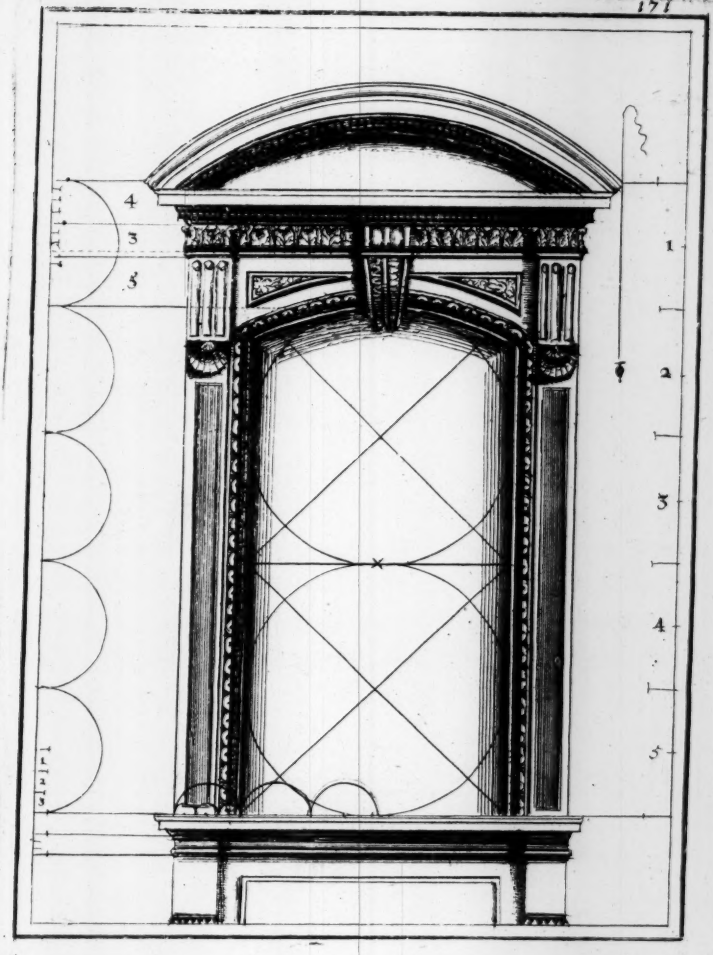
A Doore and windowe according to the Tuscan Order



A Doore and windowe according to the Dorick Order



A Doore and windowe according to the Dorick Order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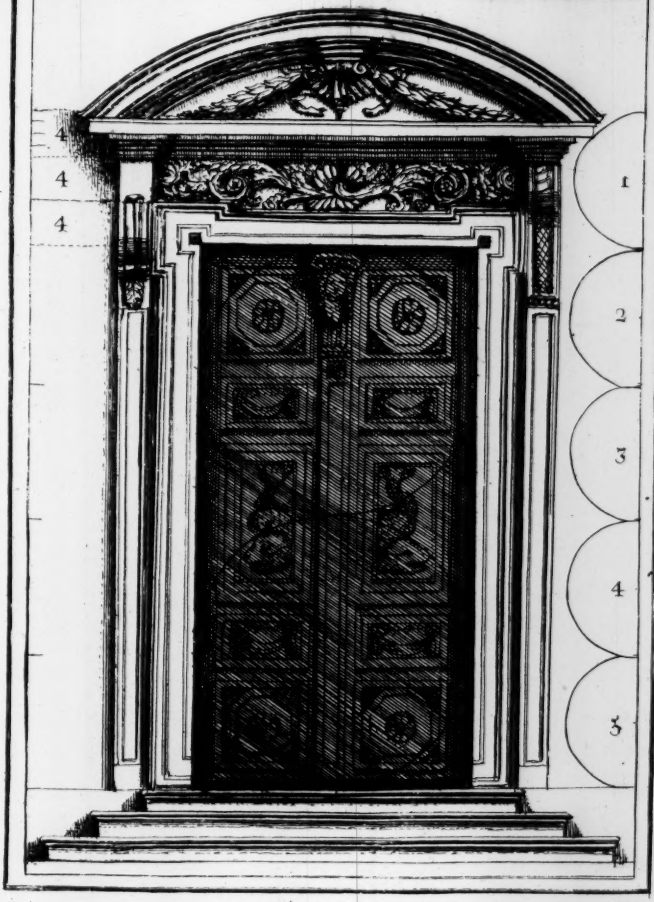
A Doore according to the Ionick Order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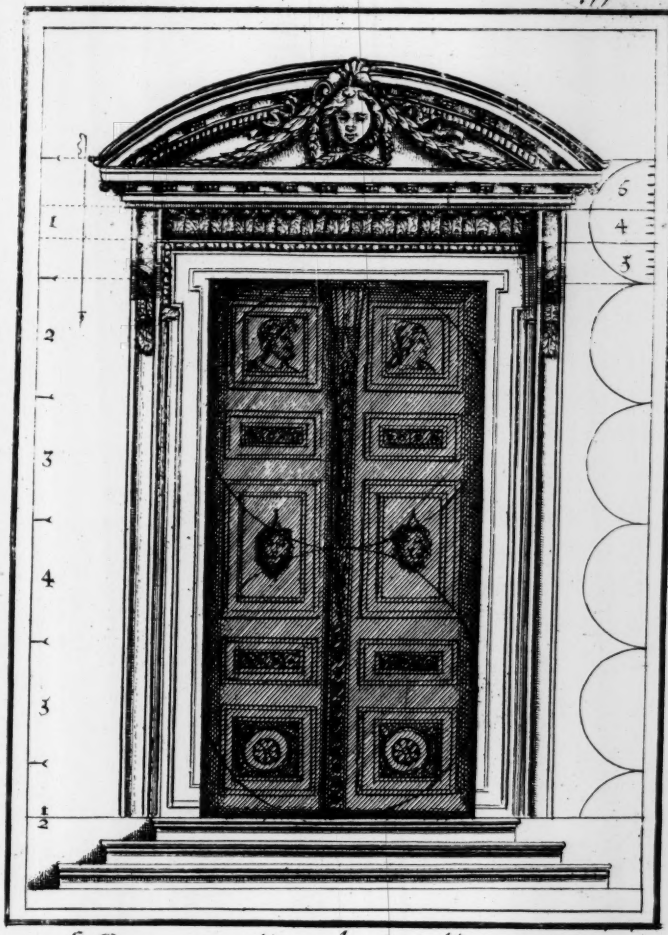
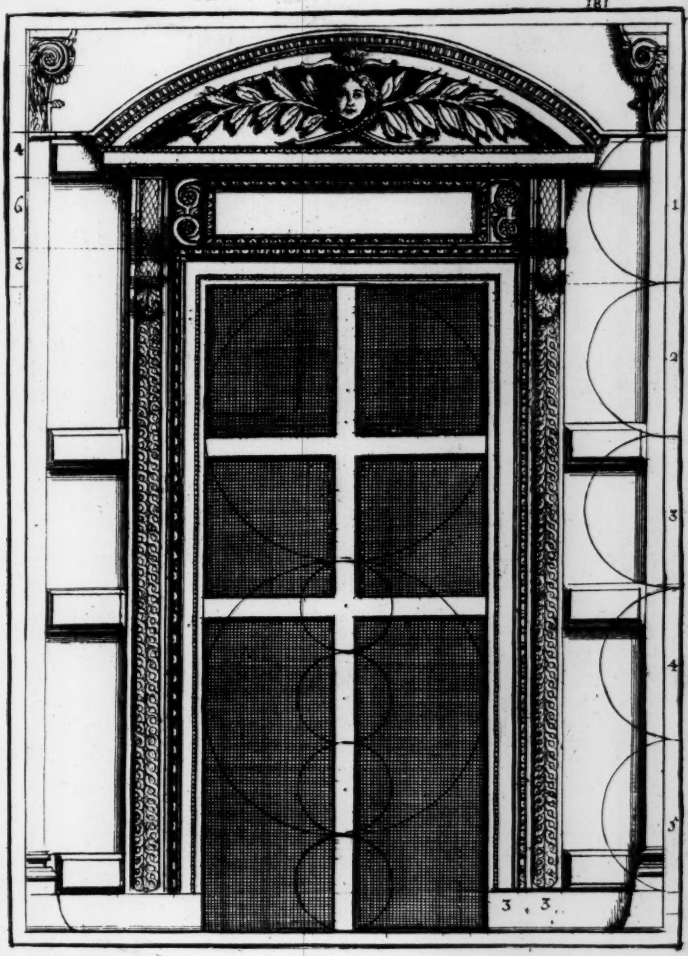


A Doore according to the Corinthian Order

The Corinthian Capitel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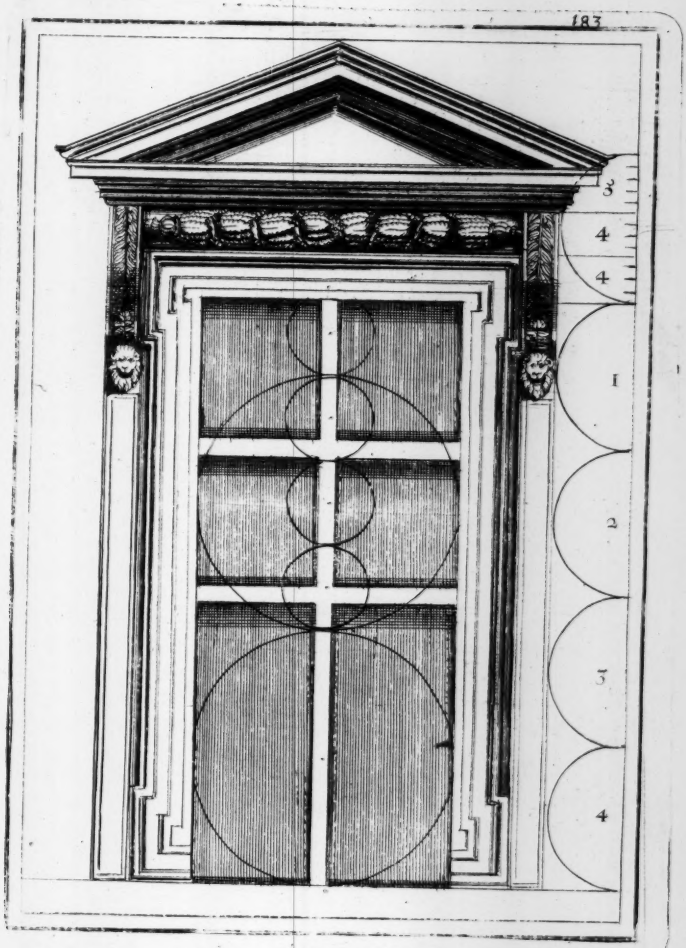
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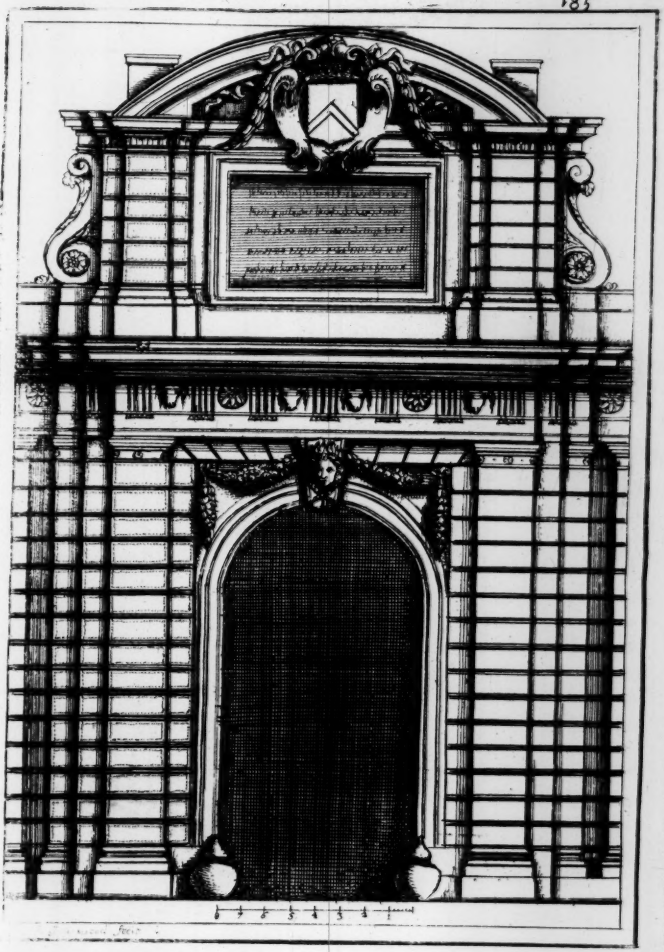

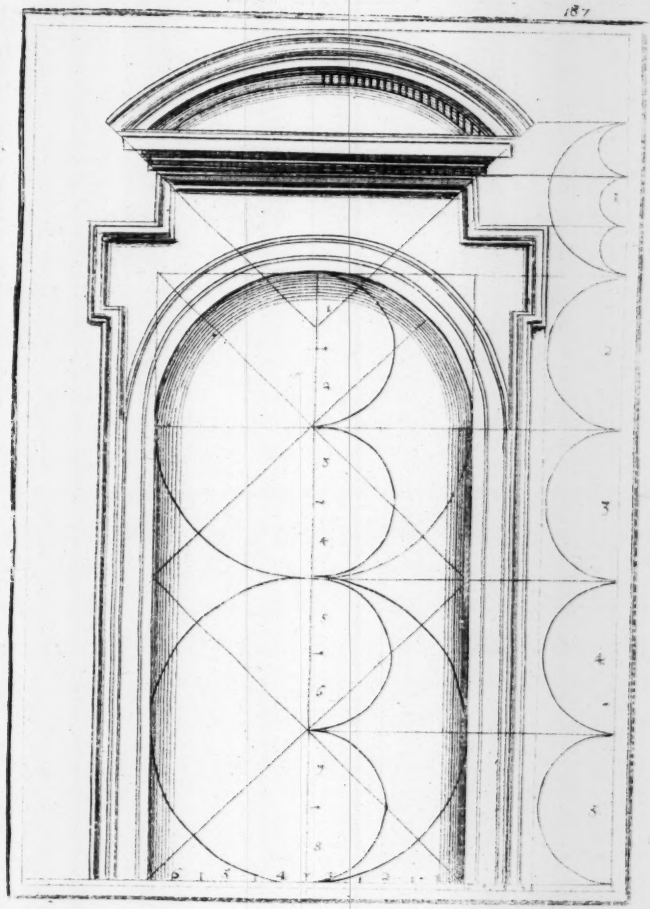

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CHAP. XXXVIII.

Of Chimnies *in* Halls, Chambers, Studies, *and* Wardrobes, *and of their Proportions.*

Hall-Chimnies ought to be within work six or seven foot, and in great Buildings unto eight, between the two Jaumes; And 'twill be convenient to make their *Funnels* in the thickness of the wall, if possibly it can be; if not, they must be set in a place where they may correspond to those of the *Chambers*, the which spreads it self but little in the middle, as it hath been said; and if it be possible, it must be so disposed, that the *Chimney* be seen in the front by them that shall enter into the *Hall*.

Their height must be four foot and ½ to five at most, from the bottom of the Plate-band to the Mantle-tree; they must project two foot and half, or three-foot at most, from the wall unto the Mantle-tree. The Jaumes must be from eight to twelve inches in breadth: and in great Buildings even to 24, or more, according to that Order of *Architecture*, with which they are to be adorned.

CHAP. XXXIX.

Of Chamber-Chimnies, *and of their Proportions.*

Chamber-Chimnies must have in breadth five and ½ or six foot, and in great Buildings unto seven, and must be placed as I have said before, because of the place of the bed. Their height must be four foot, or four and ½ from the Mantle-tree or

Plate-band, their *Projecture* muſt be two foot, or two and ½ from the back to the Fore-ſides of the Jaumes.

CHAP. XL.

Of the Chimnies *in* Studies *and* Wardrobes.

Chimnies in theſe Roomes muſt be four foot, four and ½ or five foot at moſt in breadth: Their height from the Mantle-tree muſt be like to that above of four foot, and ½. and alſo their *Projecture* two foot, or two and ½ from the back.

CHAP. XLI.

Of Funnels *of* Chimnies.

Funnels of *Chimnies* muſt be carried thorow the Roofe, and above the ridge, three foot, four or five foot at moſt, that they may carry the ſmoak into the Aire. You muſt take care that they be not made neither too wide nor too narrow; for if they be too wide, the wind will drive back the ſmoak into the Room, and will not permit it freely to aſcend and paſs forth; And in *Funnels* too narrow, the ſmoak not having free paſſage is repulſed, and returnes backwards: Therefore 'tis that *Chamber-Chimnies* are not made narrower then ten or eleven inches, nor broader then fifteen, which is the ordinary depth of *Funnels* of great Kitchin Chimnies, by reaſon of the great fire that is made therein; And for their breadth, they muſt be four or five foot at moſt within the work, from the place where the breſt ends unto the top of the *Funnel*; Now the ſaid breſt reacheth from the Mantle-tree unto the Sieling or pitch of the Arch, alwayes diminiſhing within the work, untill you come

to

to the measures of depth and breadth before mentioned; And from thence arising unto the end of the *Funnel*, it must be carried up as even as you can possibly; for failing in this, it often happens the smoak is offensive.

CHAP. XLII.

What is to be observed in making Chimnies, *and the fashion which was practised among the Ancients.*

THe *Jaumes* and *Mantle-trees* of *Chimnies* must be curiously wrought; for rustick work doth not appear well, unlesse it be in very great Buildings, for the Reasons aforesaid.

The Ancients, to heat their Chambers, did serve themselves in this manner: They made their *Chimnies* in the middle, with Columnes or *Corbeaux* which bore up the *Architrave*, upon which were the *Funnels* of the *Chimnies* which conveied away the smoak; of which kind one may be seen at *Bay* near the *Piscine* of *Nero*, and one which is not far from *Civita Vecchia*; and when they would not have *Chimnies*, they made in the thickneſſe of the wall pipes or funnels, thorow which ascended the heat of the fire which was under the *Chamber*, and was conveied forth through certain vents and conducts which was on the top of the funnels. Much like this, the *Trenti* Gentlemen of *Venice* in the Summer refreshed their *Chambers* at *Costoza*, their Country dwelling: For in that place there are great Mountaines in which are certain great Caves, which in times past were Quarries, which I (suppose) *Vitruvius* meanes in his second Book, where he treates of Stone. In these Caves are ingendred extream coole winds, which these Gentlemen caused to be brought into their house, thorough certain *Subterranean* vaults; and by the meanes of certain trunks, like to those whereof I have spoken before, make them to run thorow all the *Chambers*, opening and shutting them at pleasure to take more or

leſſe of Aire, according to the time and ſeaſon ; And this place would be wonderfull were it only for this great Commodity, nevertheleſſe that which renders it yet more admirable and worthy to be ſeen in the priſon of the wind, which is a certain *Chamber* under ground, made by the moſt Noble *Seignior Trenti*, and by him called *Æola*; where many of theſe trunks and conducts of wind are diſcharged ; And to render it beautiful, and worthy of this name he hath given it, he hath ſpared neither care nor charge.

CHAP. XLIII.

Of Staire-Caſes, *and their divers manners, and the numbers and greatneſſe of their* Steps.

THere ought to be great care taken in the well placing the *Staire-Caſe* ; for there is not a little difficulty to find a place convenient, ſo as the *Staires* may be diſtributed without prejudice or hindrance to the reſt of the Building ; 'Tis therefore that ordinarily they are placed in the corner of the Building, or on the wings, or in the middle of the front, which is but ſeldom, unleſſe it be in great Buildings; becauſe much of the Stone-work will be hindred by reaſon of the *Staires* being in the middle, unleſſe the houſe be double.

There are three openings neceſſary to the leaſt *Staire-Caſe*, the firſt is the doore-way that leads to them, which is the better when it is ſpacious, and pleaſeth me moſt if it be in ſuch a place where, before one approacheth, one may ſee the beſt part of the houſe : for although the houſe be little, by this means it appeareth much larger; nevertheleſſe it behoves that the ſaid *Doore-way* be obvious and eaſie to be found.

The ſecond opening is that of the *Windowes*, which are needful to give light to the *Staires*, and when there is but one, let it be in the middle as near as you can, to the end that all the *Staire-Caſe* may be inlightned.

The

The third opening is the landing place, by which we are to enter into the Roomes above, and ought to lead to places large, faire, and well adorned.

Staires will be well made, if they be ſpacious, light, and eaſie, ſo as they may invite people to go up.

They will be lightſome when they have a perfect light, that diſperſeth it ſelf to all parts equally.

They are ſpacious when they appear not little, nor narrow in reſpect of the bigneſſe and quality of the Fabrick; but they muſt never be narrower then four foot, to the end, that if two perſons meet, they may commodiouſly paſſe one by the other; They may be made of five, or ſix foot, or ſeven and half, and to great Buildings unto ten or twelve foot broad to every flight, and they muſt be made as commodious as poſſibly you can.

CHAP. XLIV.

Of the Height and Breadth of Steps.

THe *Steps* ought not to be more then ſix inches high; and if they be lower, they muſt chiefly be to long and continued *Staires*; They will be ſo much the eaſier, becauſe one needs not lift the foot ſo high; but they muſt never be lower then four inches.

Their breadth ought not to be leſſe then a foot, nor more then fifteen or ſixteen inches.

The Ancients obſerved not to make the number of *Steps* even, to the end that beginning to aſcend with the right foot, they might end with the ſame foot, which they took to be a good *Omen*, and with greater devotion ſo to enter into the Temples.

CHAP. XLV.

Of Divers manners of Staires.

Staires are made Straight or Winding: the Straight are made ſpread abroad into two branches or paſſages, or ſquare, which turnes into four branches or paſſages; and to make them in this laſt manner, all the ſpace muſt be divided into 4 parts, whereof 2 muſt be for the *Staires*, and 2 for the vacancy; The middle whereof if it be open, the *Staires* receive light. They may be made with a wall within, and then within the two parts which are taken for the *Staires* the thickneſſe of the wall ought to be comprehended and incloſed, which makes the *Caſe* or *Newel*; They may alſo be made without a wall within, theſe two ſorts of *Staires* were made by the Invention of *Seiginour Lovis Cornaro*, a Gentleman of an Excellent Judgement.

Winding-Staires, ſome are made round, ſome oval, ſome with a *Newel* in the middle, and ſome open; And ſuch *Winding-Staires* are made chiefly where there is little room, becauſe they take up leſſe room then the ſtraight *Staires*, yet not ſo eaſie to aſcend. Thoſe which are open in the middle are very handſome, becauſe they may have light from above, and thoſe who are above may ſee thoſe who are coming up, and are alſo ſeen by them.

Thoſe which have a *Newel* in the middle, having but little roome are made in this manner: you muſt divide the Diametre into twelve parts, ten whereof are for the *Staires*, and the two which remaine are for the *Newel* in the middle; Or divide the ſaid Diametre into eight parts, ſix whereof are for the *Steps*, and two for the *Newel*; And if there be much room, you muſt divide the Diametre into three parts, whereof two are for the *Staires*, and one for the *Newel*, as in the deſign A; Or otherwiſe, you may divide the Diametre in ſeven parts, of which take three for the *Newel* in the middle, and four for the *Staires*; Juſt in this manner is the *Staire-Caſe* of the Column of *Trajan* at *Rome*; and if you make *Staires* winding as in the deſign B, they

they will be handſomer and more agreeable, and longer then if they had been ſtraight; But to *Staire-Caſes* open in the middle, the Diametre muſt be divided into four parts, two whereof muſt be for the middle, and two for the *Staires*.

Beſides the faſhion of *Staires* which are in practice, there hath been a *Winding-Staire* invented by *Mark Anthonie Barbaro*, a Gentleman of *Venice* of an Excellent Judgement, who made excellent experiments in very narrow places, where there is no *Newel* in the middle; and the *Staires* in their turning are much longer, and are divided after the manner aforeſaid.

Thoſe which are oval are divided in the ſame manner as the Round; they are very handſome and pleaſant, becauſe all the *Windowes* and *Doores* are in the middle and head of the oval, and are very commodious; I have made one open in the middle in the Monaſtery of *Charity* at *Venice*, which hath ſucceeded very well.

There is another very handſome manner of *Staires* which King *Francis* the Firſt cauſed to be made in the Caſtle of *Chambor* near *Bloyſe*, and is in this manner; There are four *Stair-Caſes* which hath four Entrances, to wit, one Entry to each, and go up the one over the other in ſuch manner, that being made in the middle of the Building, the four may ſerve for four Appartements; ſo that the Inhabitants of one need not go up and down the *Staires* of the other; And becauſe it is open in the middle, they all ſee each other go up and down, without any hindrance the one to the other. This Invention being new and handſome, I have placed it here, and marked with Letters from the foot to the head, to the end every one may ſee where each *Staire* begins and where it ends.

There was alſo to the *Porticos* of *Pompey* at *Rome*, leading to the place of the *Jewes*, *Winding-Staires* of an admirable form; for being placed in the middle, in ſuch manner that they could not receive light but from on high, they were ſet upon Columnes, to the end that the light might diſtribute it ſelf to all parts alike; According to which example, *Bramante* an Excellent Architect in his time, made one of them at *Belvedere*, and without *Steps*, having the four Orders of Architecture, *Dorick*, *Ionick*, *Corinthian*, and *Compoſita*; to make theſe *Staire-Caſes*, you muſt divide

vide the whole ſpace into four parts, two whereof are for the void place in the middle, and one on each ſide of the *Steps* and Columnes.

There are many other faſhions of *Staire-Caſes* in Ancient Edifices, as *Triangulars*; and of this ſort are thoſe of the Steeple of St. *Maria Rotunda*, which are open in the middle, and receive light from above: Thoſe alſo which are at *Sancto Apoſtolo* in the ſame City, by which we go up to *Monte Cavello*, which are very magnifick, and they are double. Many perſons have taken the model thereof, and carried it to a Temple on the top of a Mountain, as appeares in my Books of *Temples*; and of this ſort is this laſt deſign.

You muſt note, that in *Staire-Caſes* which are ſquare or oblong, when you are conſtrained to place *Steps* in the Angles, in turning you cannot make more then ſix in a Semicircle, which are three in ¼ of a Circle, and is then, when the *Staire-Caſe* ſhall have but ſix or ſeven foot in breadth within work, which is the leaſt that can be made.

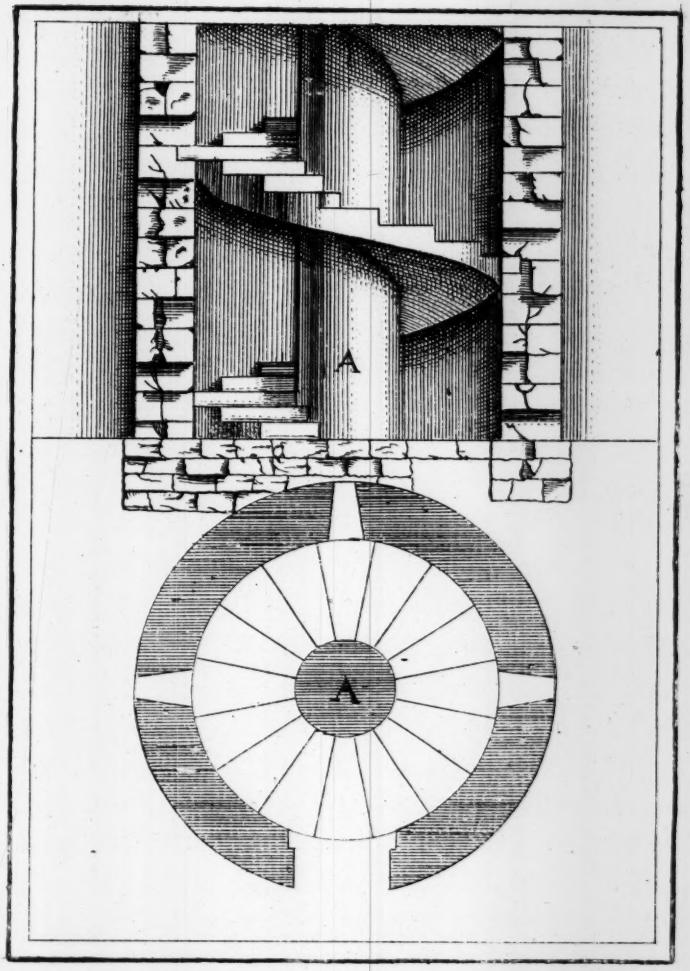
To *Staire-Caſes* of eight foot broad, you muſt put eight *Steps* from the Angle, turning to a Semicircle, which will be four to ¼ of a Circle.

And to *Staire-Caſes* from nine to ten foot broad, you muſt put ten *Steps* to a Semicircle.

If they have eighteen foot more or leſs, you may make twelve *Steps* to a Semicircle.

You muſt take heed that the landing place of the *Staires*, which is the ſpace between the wall and the *Steps* which one aſcendeth, and which doth diſtribute to the Apartements, be broader a fourth part at leaſt then the length of the ſaid *Steps*.

Examples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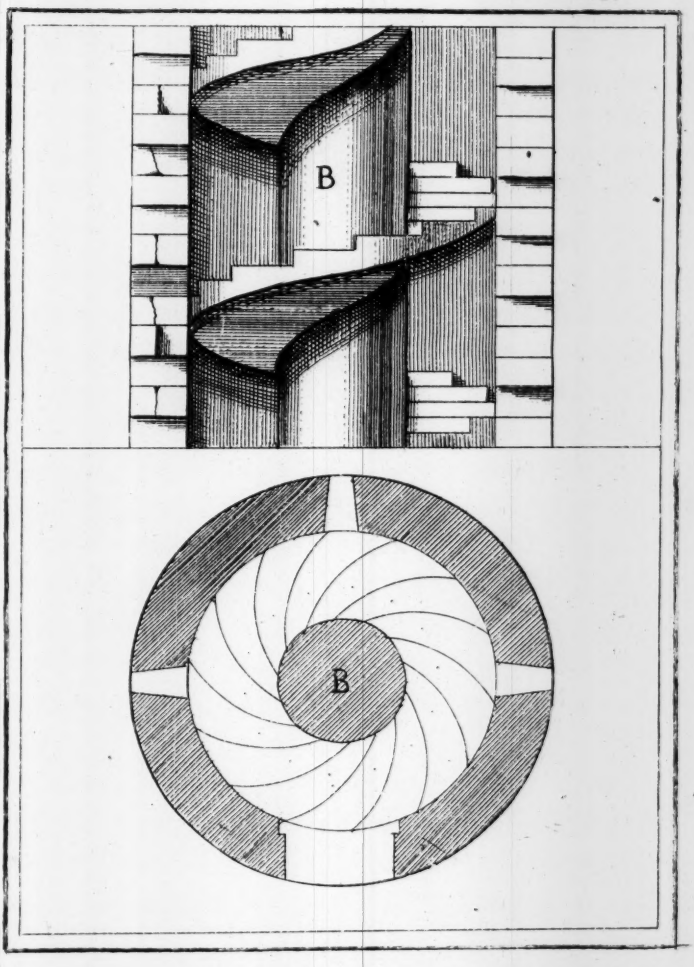
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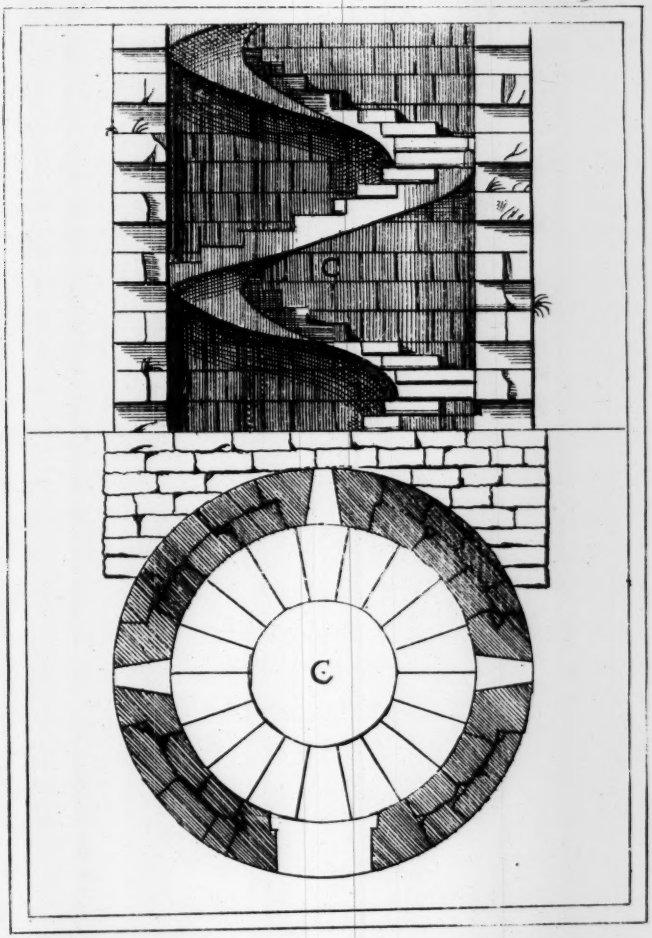
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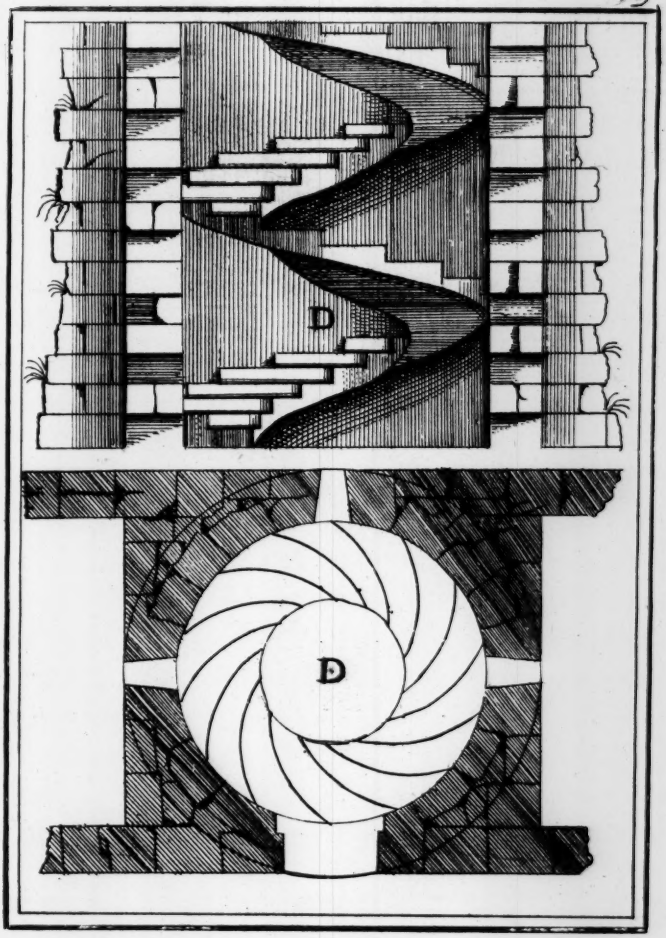
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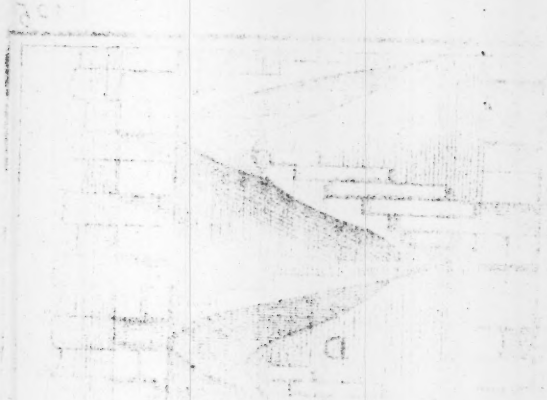
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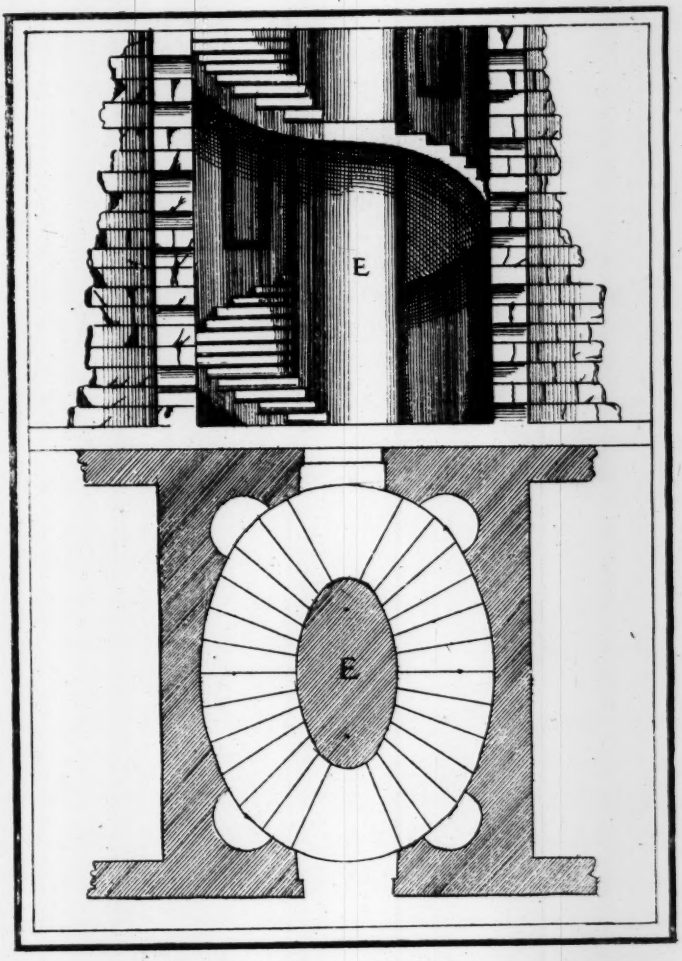
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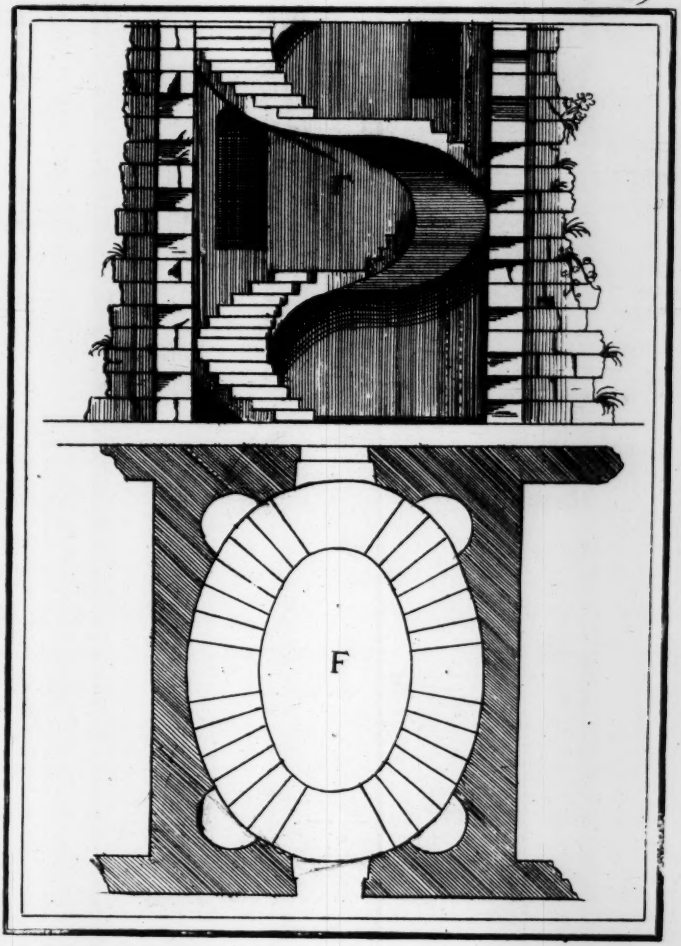
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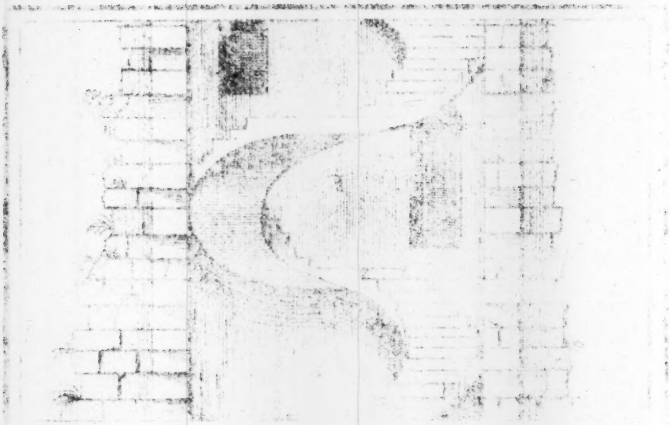

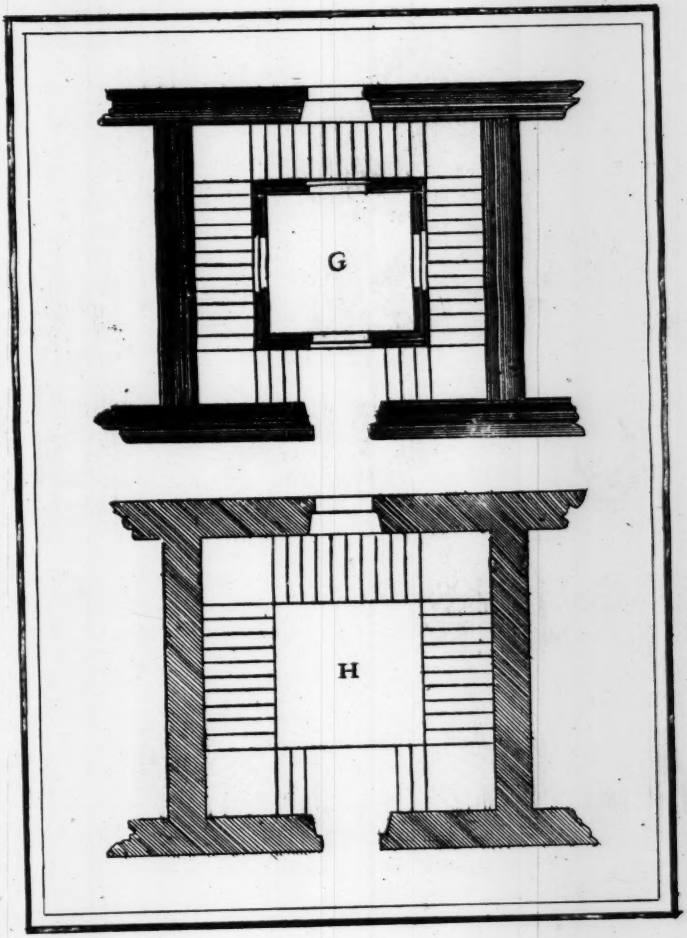
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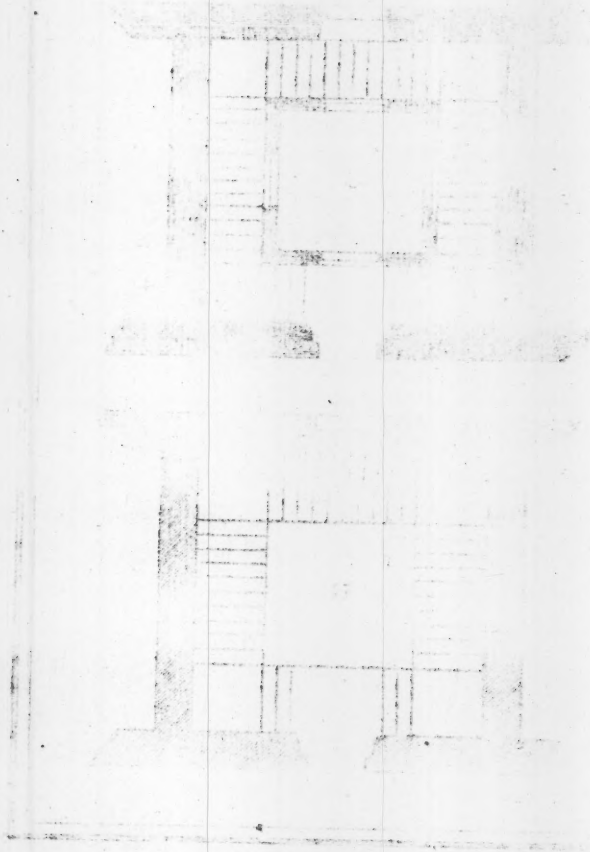

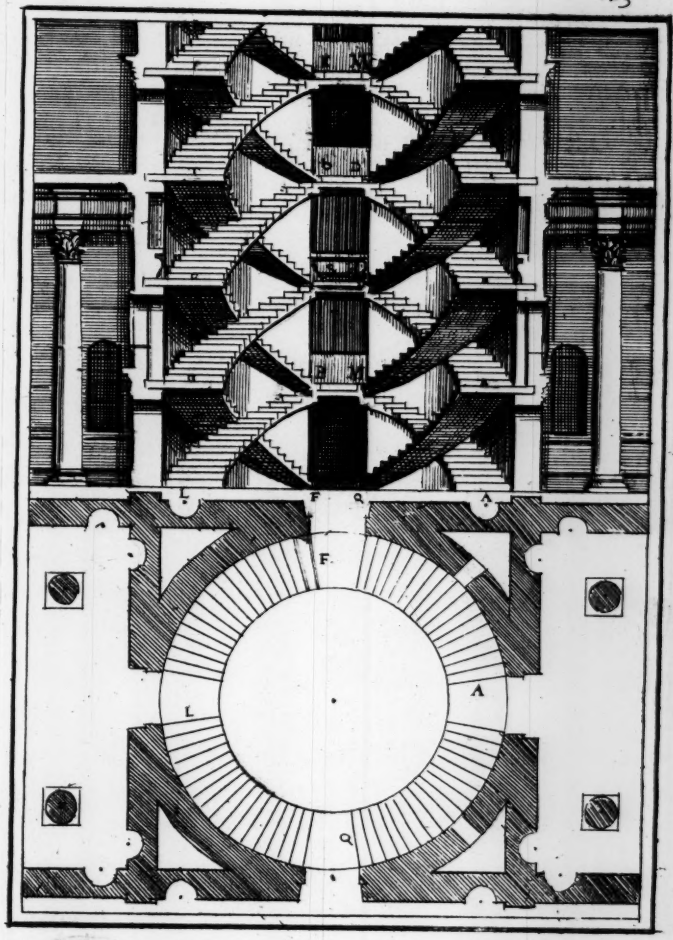
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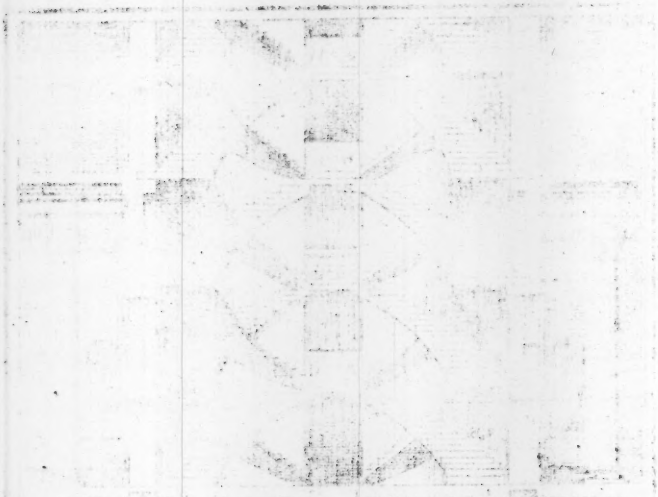

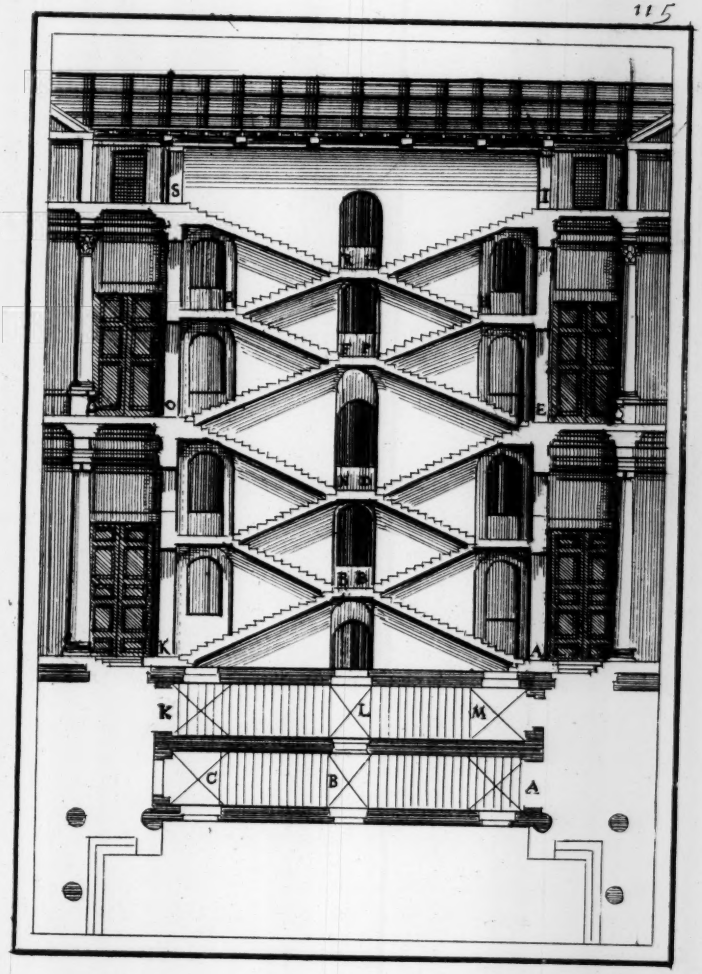
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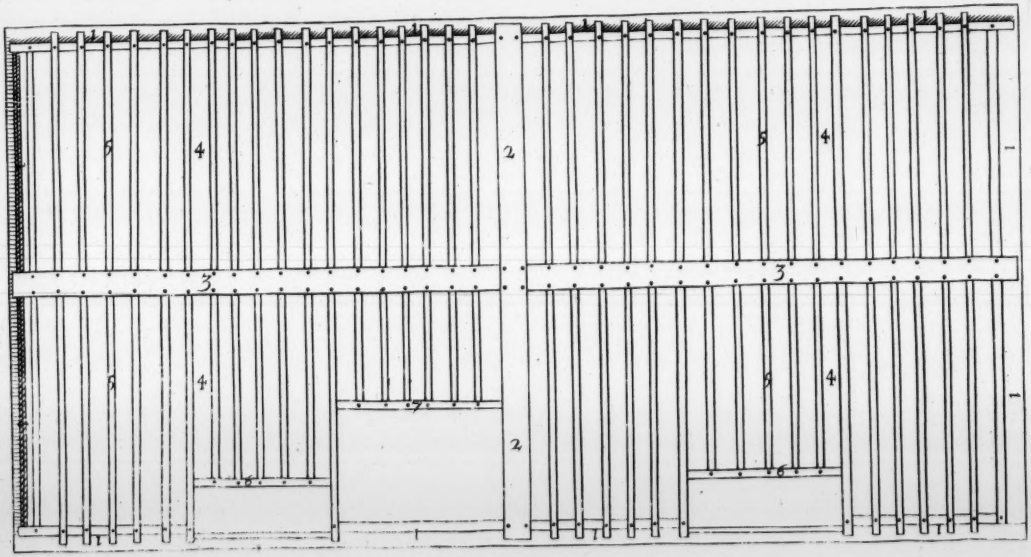
Examples of the Proportion of the Pitch of Roofes, *and their framing according to the beſt manner now practiſed in* England; *with the manner how to find out the length of the* Hip *and* Sleeper, *proportionable to all Breadths.*

CHAP. XLVI.

The Manner of Framing the Floore, *with the Names of each Member.*

1. THe thickneſſe of the *Wall*, and Lintel or *Wall*-plate; *and if it be in Timber work, then a Breſſummer.*
2. *The Summer.*
3. *Girders framed into the Summer.*
4. *Spaces between the Joiſts.*
5. *Joiſts.*
6. *Trimmers for the Chimney way*
7. *Trimmers for the Staire-Caſe, or well-hole for the Staires.*

CHAP.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CHAP. XLVII.

Of the Design A.

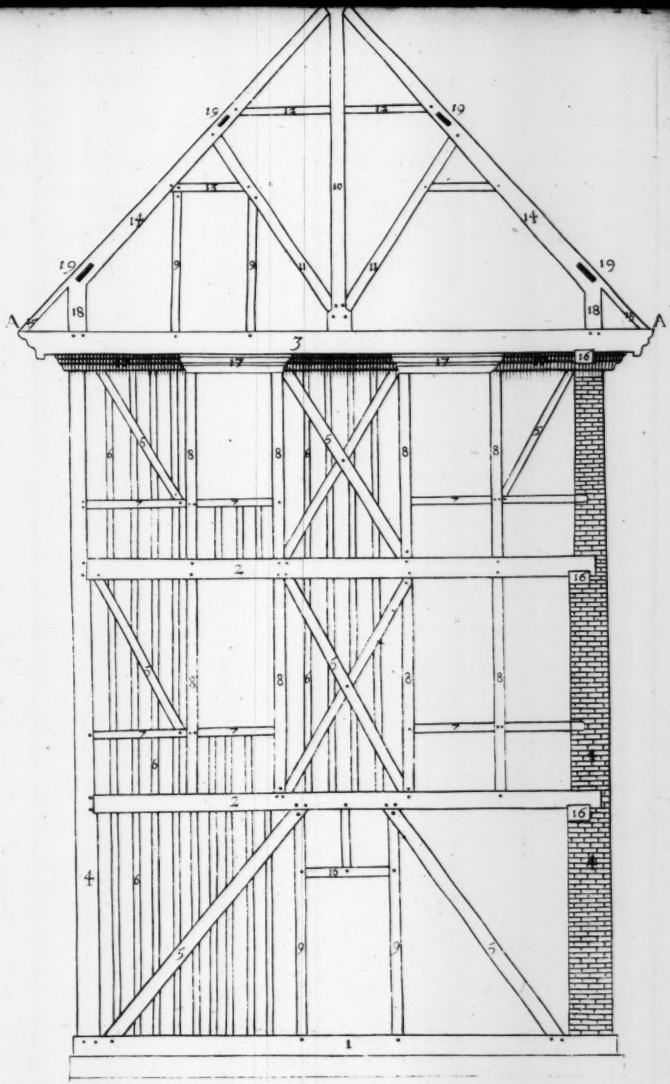
A. A. THe Breadth of the House, *Cantilivers*, *Cornices*, and *Eaves*;
A. B. The Length of the Rafters and Furrings, which ought to be ¾ of the Breadth of the house A A.

The principal Rafters to be cut with a *Knee* (as in the Design) that they may the better support themselves and the burthen over them upon the upright of the wall, and also secure that part from the dripping in of the Rain; which otherwise would happen if the Rafters were made straight and furred.

The Beam to the Roof, or Girder to the Garret floore, ought to project without the work, as far as the Furring or Shreading, which is the *Projecture* of the *Cornice*.

This manner of framing the Roof will be usefull from 20 to 30 foot, or thereabouts.

1. *Ground-Plate.*
2. *Girder, or binding Interdeuce, or Bressummer.*
3. *Beam to the Roof or Girder to the Garret floore.*
4. *Principal post and upright brick wall.*
5. *Braces.*
6. *Quarters.*
7. *Interduces.*
8. *Prick-post, or Window-post.*
9. *Jaumes or Doore-post.*
10. *King piece, or Joggle piece.*
11. *Strutts.*
12. *Coller-beam, Strutt-beam, winde-beam, or top-beam.*
13. *Doore-head.*
14. *Principal Rafters.*
15. *Furrings or Shreadings.*
16. *Ends of the Lintels, and pieces.*
17. *Bedding-moulding of the Cornice over the Windowes, and space between.*
18. *Knees of the principal Rafters, which are to be of one piece.*
19. *Purline Mortices.*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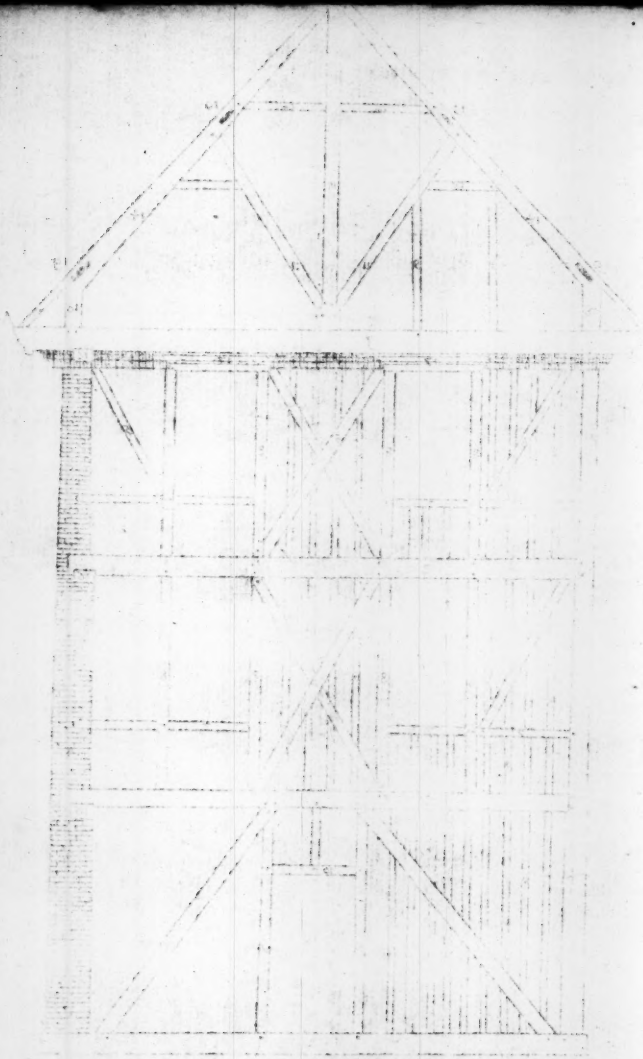
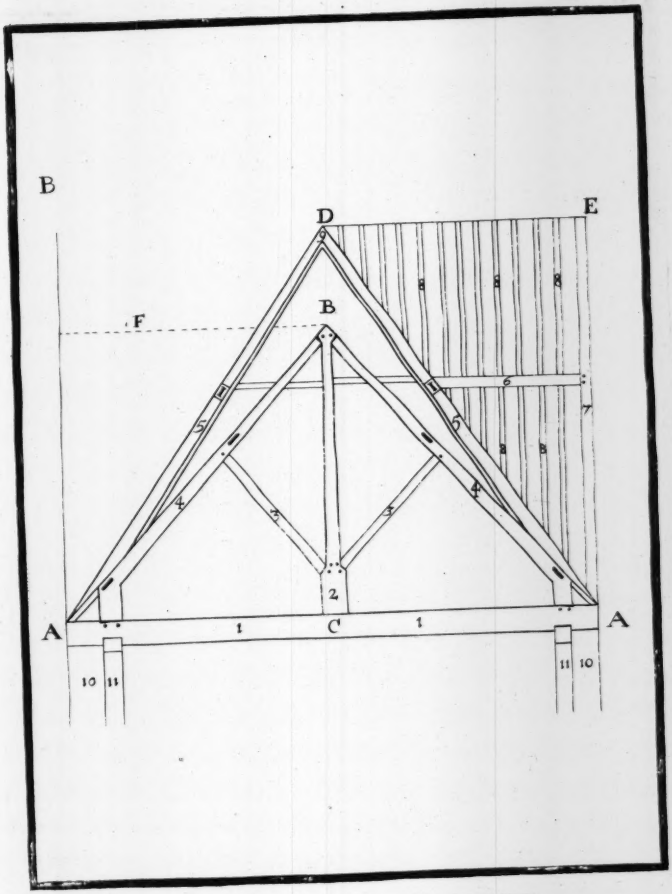


CHAP. XLVIII.

Design of the Gable End *or* Roof B.

LEt the whole Breadth of the *Gable End* or *Roof* A A be 20 foot, divide the same into 4 equal parts, take thereof three for the length of the principal Rafter A B, and placing that perpendicular from the point C to the point D, begets the length of the *Sleeper* A D, which will be 18 foot. And the length of the *Dormers* principal Rafter from A to E, when laid to its pitch upon the back of the principalls, will reach to the level line F B, or top of the principal Rafter; And this is a general rule for all Breadths.

1. *Summer or Beam.*
2. *King piece, Crown post, or Joggle piece.*
3. *Braces, or Strutts.*
4. *Principal Rafters.*
5. *The Sleeper.*
6. *Purline of the Dormer.*
7. *Principal Rafter of the Dormer.*
8. *Single Rafters of the Dormer, standing on the Sleeper and Purline.*
9. *Point of the Sleeper.*
10. 11. *The thickneſſe of the Wall and Lintels, or wall-plates.*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CHAP. XLIX.

Of the Italian *or* Hip Roof C.

A. A. THe Breadth of the Roof, being 20 foot.
A. B. The length of the *Sleepers* or *Hips*, being 18 foot, which is proportionable to the breadth of the House.
E. D. The height of the Roof perpendicular.
C. D. The length of the *Hip*, and the Angle which it maketh upon the *Diagonal* line, which is shewed by the prick line G, from F to C.

1. 2. *The Wall and Lintells.*

3. *Dragon Beam for the Hip to stand on.*

4. *Beam or Summer, wherein the Dragon-Beames are framed.*

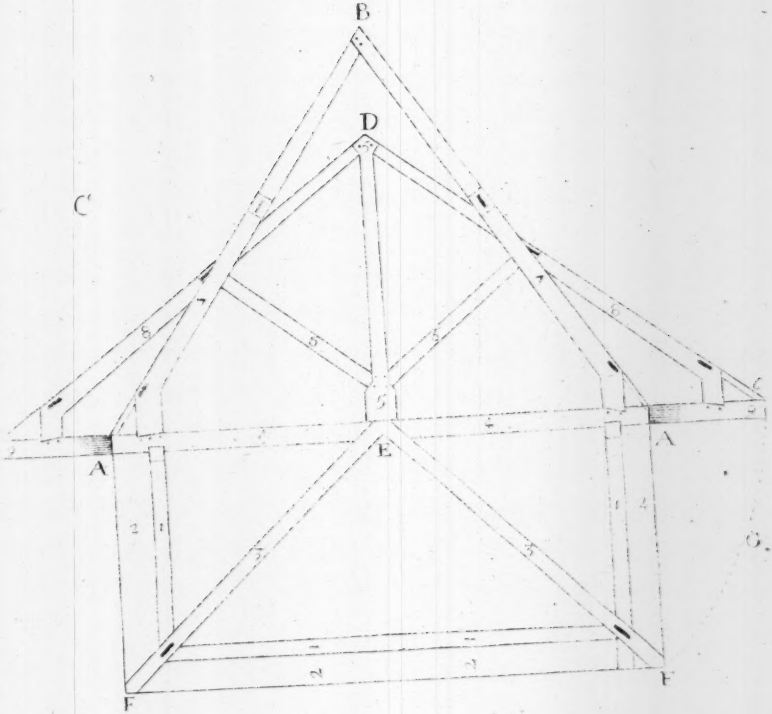
5. *King piece or Crown post.*

6. *Struts or Braces from the Crown post to the Hip Rafter.*

7. *Hips as they make the Angle equal to the breadth of the House.*

8. *Hips as they make the Angle in the Diagonal lines from Corner to Corner.*

9. *The Additional length which the Hips make upon the Diagonal line, more then the breadth of the House.*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CHAP. L.

Of Flat Roofes D.

WIthin a *Camber-Beam* and *Rafters* joggled in, whose weight lyeth not chiefly in the middle, and may be so made that without hanging up the Beam, the principals may discharge the weight; And how Drips may be made to walk on.

1. *Camber Beam.*
2. *Principals joggled into the Camber-Beam*
3. *The place where the principals are joggled in.*
4. *Punchons or Braces.*
5. *Drips to walk on, and may be made with the lesse current that the Roof may be made the more pitch for the strengthening thereof: And may be made higher or lower according to the Building and Discretion of the Architect.*
6. *Battlements.*

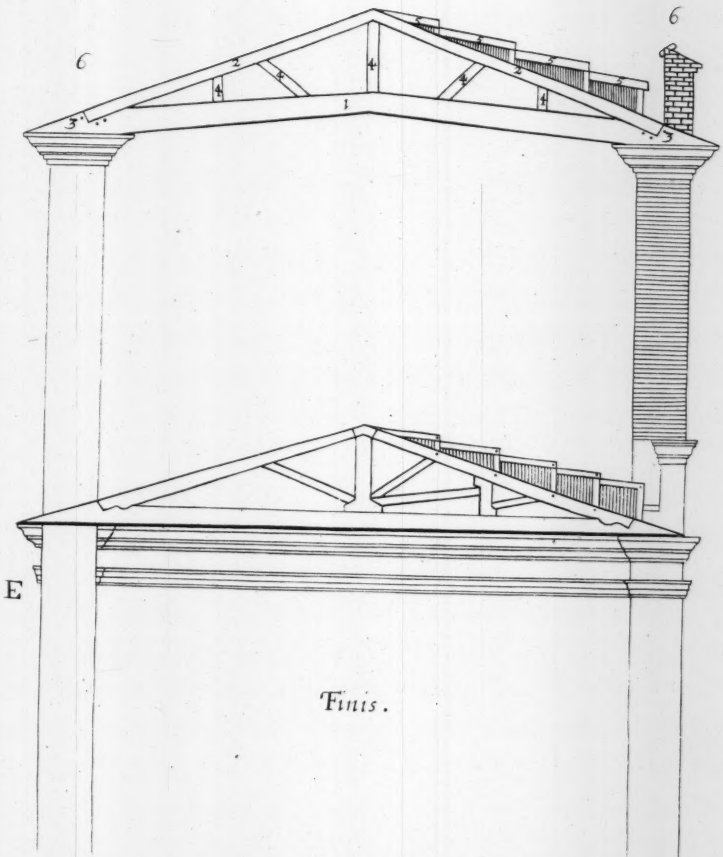
CHAP. LI.

Of a Flat Roof, *with a* Crown post, *or* King piece E.

IF any of these Rooses be hipt, the former generall Rules may serve for a Rule to find out the back and the length of the Hip-Rafter or Sleeper for these also: Except the *Roof Bevells*, or be out of square, then the *Bevel Line* (instead of the *Horizontal*, or *Level line* of the Floore, with the back of the *Hip Rafter*) shall alwayes become the *Angle lines*, by which the back of the *Hip Rafter* shall be made. And for *Dormers* if *Bevell*, must be the same thing Reversed.

FINIS.

Page 2 line 24 25 and 26 for Rafting and Rafters read Joists, page 87 line 4 for four remaines, read five remaines.



Finis.